# THE IRON AGE

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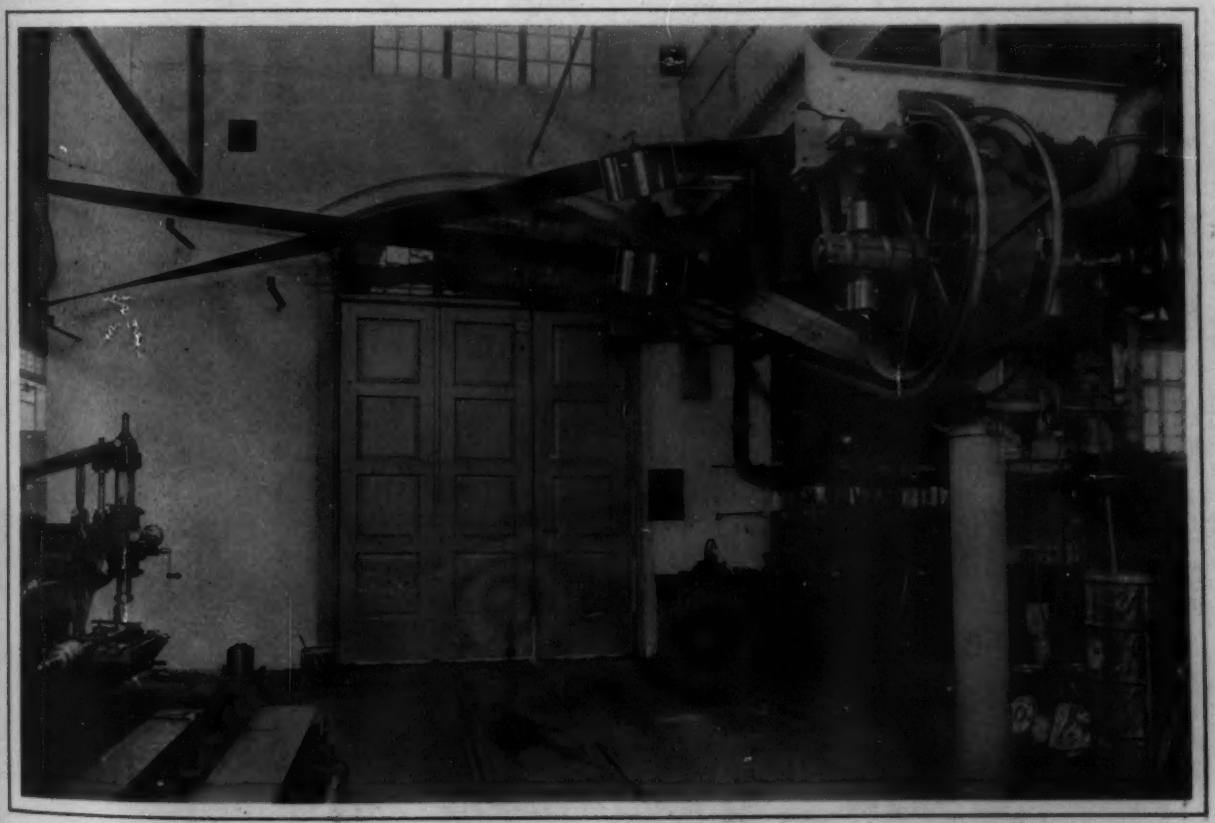
# Achievements In Leather Belt Drives

## Examples of Practice, Chiefly European, Showing How the Leather Belt has been Employed to Meet Trying Power Transmission Problems

Some photographs of noteworthy applications of leather belting for power transmission, calculated to prove valuable by way of suggestion to power users, were recently obtained chiefly from Chas. A. Schieren, Jr., of the Chas. A. Schieren Company, New York, and those thought specially likely to enlighten the works' manager have here been reproduced. The photographs cover work installed by the Berlin Anhaltische Maschinenbau Aktien-Gesellschaft, and in addition what may be termed a patented idler arrangement applied to a gas engine driving the a booth equipped with what may be called miniature reproductions or reproductions in principle of factory drives using the Schieren Duxbak belting. The drives in the expositions had necessarily to be robbed of the surrounding circumstances, but they served to impress on visitors the character of difficult power driving the leather belt can solve. Some of these driving problems involve changes in angle as well as in elevation of the two lines of shafting connected and others involve the use of patented attachments. One of these in particular goes under the name



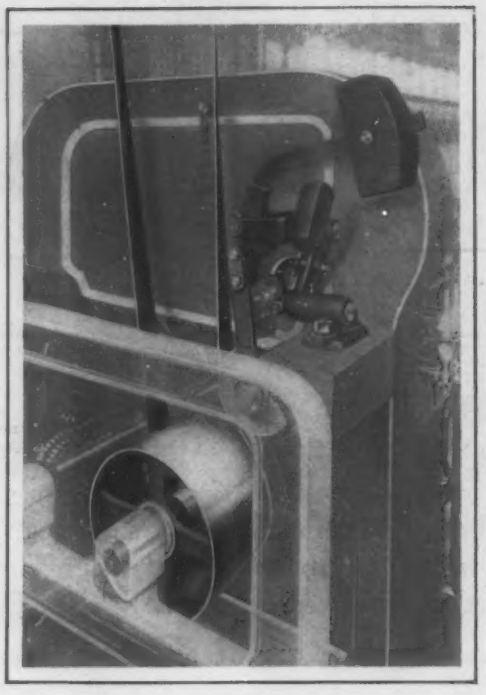
View of Belt Transmission Around a Corner, Showing also Protection Against the Fall of a Ruptured Belt

machine shop in Jersey City, N. J., of the F. L. Smidth Company. The pictures show the relative ease of connecting for driving purposes two lines of shafts having in some cases no simple relation to each other and in others a relation which would make a belt drive either impossible or impracticable.

The European installations have already been referred to in these columns in connection with the exhibits of the Schieren Company at both the Brussels and the Turin expositions. In each of these exhibitions the company had of the Lenix system, the development of a French engineer by the name of Lenevieux, and is an idler mounted in a freely moving carrier but equipped with weights which may be varied in position to control the pressure which the idler itself puts on the slack side of the belt. Located near a small driving pulley it serves to give a maximum arc of contact between the belt and the pulley, and the freedom of suspension of the idler allows it to compensate for variation in conditions of power demand. The special advantage of such an arrangement is that not only may

a large ratio of speed reduction be secured with the one belt, but the distance between centers of the driving and driven pulleys may be minimized and the belt tensions not correspondingly increased.

The picture on page 707 shows how one shaft is driven from another with a considerable distance between their ends, with the shafts set at substantially right angles to each other and at different elevations from the floor level. The drive shows how a minimum obstruction to the space above is obtained and also the free use of the doorway. It is interesting to call attention to the lattice work guard around one of the pulleys and underneath the belt, and also to the simple iron brackets driven into the wall in the background, so that in the event of a break of the belt it can be caught both along the wall and under the span between the wall and the shafting at the right.

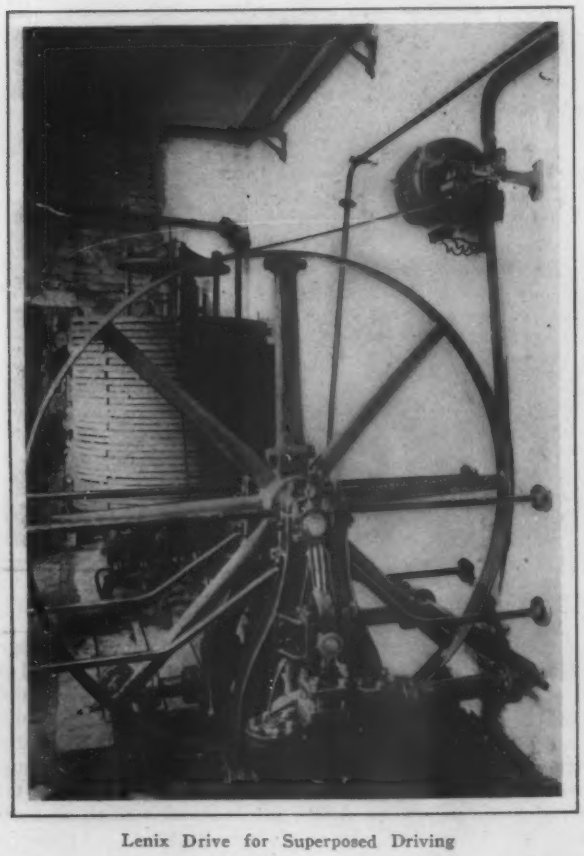


Application of Bamag Thread Protector Speed Regulator

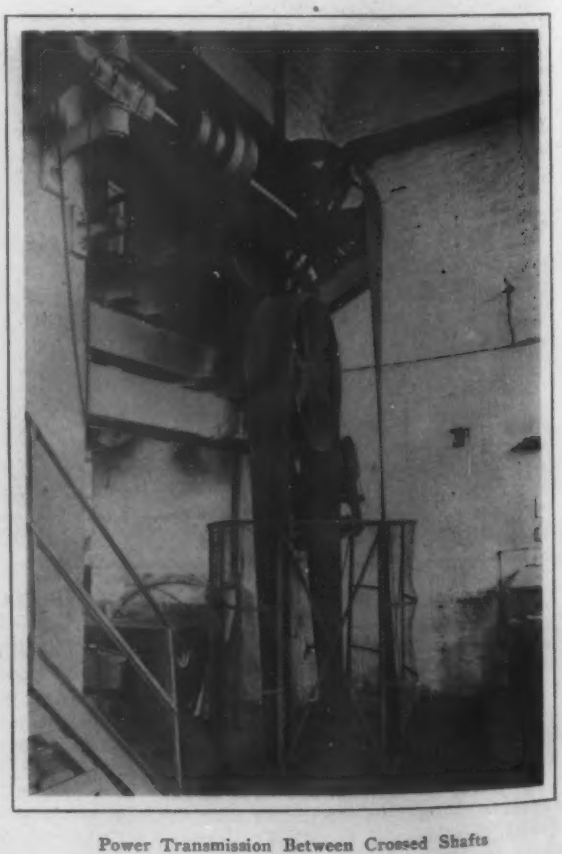
Two of the pictures show applications of the Lenix system. One of these is a view of a hydraulic pump driven at relatively slow speed by a small high speed motor attached to the wall. Here the driving and driven shafts are substantially vertical one over the other, and ordinarily a high belt tension would be employed should a single speed reduction be attempted with an ordinary belt connection. By the use of the Lenix idler it is found that the required difference in belt tension of the tight and slack sides, in connection with the increased arc of contact secures the proper power transmission without giving rise to high belt tension. In short, the point is that without the idler, practically the required difference in belt tension might easily be obtained and the driving capacity secured, but the tension on the tight side added to the tension on the slack side would give a resultant pressure on the motor bearing and similarly on the pump bearing sufficiently high to introduce a large percentage of loss from friction in the bearings as well as leaving a tendency for bearing troubles on account of the high pressure.

The other view of the Lenix drive is that employed with the gas engine where its use has been found particularly beneficial in connection with the periodic impulses given to the driving pulley owing to the intermittent explosions inherent in gas engine operation. The Smidth Company, which is probably best known in this country for its production of kominuters and other machinery for cement mills, has applied the Lenix drive to such cases as tube mill driving, but as the manufacturer in this country of the Lenix system, it has also applied it to power plants and presumably all classes of work where it can be advantageously used, though no attempt has been made to catalogue either the number or character of these installations. Two instances may be mentioned. One of these is a mill drive in the Three Forks Portland cement plant at Ogden, Utah, where a 15-in. pulley 12 ft. from a 68-in. pulley is employed with a 10-in. Lenix pulley and a 16-in. single Duxbak belt.

In another case in a building power plant in New York, a belt-driven dynamo was brought 9 ft. 6 in. nearer the steam engine by the use of the drive, with a resultant saving in floor space of considerable area as well as a driving of the dynamo up to speed. Under the former arrangement the belt slipping made it difficult to keep the dynamo up to voltage and sometimes even to keep the belt on the pulley. In connection with the latter experience the Smidth Company has collected information showing a remarkable reduction in friction loss. The tension in the tight side of the belt was formerly 944 lb. and is now 522 lb., and the tension in the slack side was 470 lb. against 48 lb. at the present time. This leaves the tangential force 474 lb. in the two cases. It has been figured out that a total

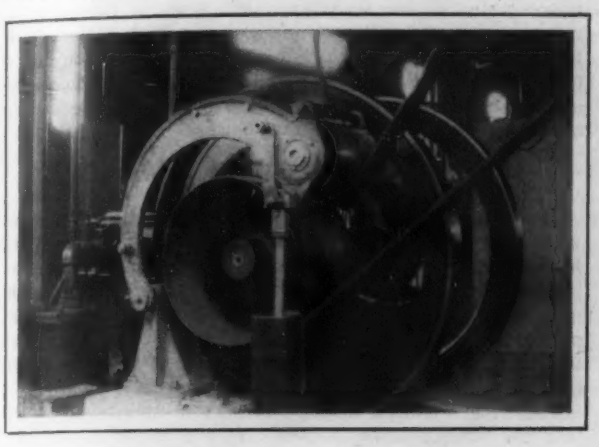


Lenix Drive for Superposed Driving



Power Transmission Between Crossed Shafts

friction loss in the bearings of the driving and driven pulleys was 2.953 hp. and the loss in the belt from bending over the pulleys, 0.045 hp. The bearing friction loss with the Lenix drive is given as 1.24 hp. and the loss in the belt from bending over the pulleys, 0.0275 hp. The slip of the belt on the pulleys is given in the ratio of 2.37 to 0.312 for the two cases. The driving pulley in this case is 66 in. and the driven pulley 17 in. The arc of contact when the distance between centers was 16 ft. was 196 deg. for the driving pulley and 164 deg. for the driven pulley, while the arcs



Lenix Idler Applied to a Gas Engine Pulley

with the reduced distance of 6 ft. 6 in. is 235 to 242 deg. for the driving pulley and 235 to 251 for the driven pulley. A 12-in. belt ⅜-in. thick was formerly used and now a 10-in. belt 3/16-in. thick suffices.

Other illustrations show a drive employed by what is known as the Bamag wheel and show how two shafts at an angle with each other but close together are connected by a single belt. The arrangement is regarded as taking the place of the bevel gear with higher efficiency and less noise than would be possible with the gears.

Another of the illustrations shows the control of a speed regulating device involving a conical pulley known as the Fadenschützer Bamag and is shown provided in a spinning mill where it is desirable to change speed during operation. It is claimed that the device extends the life of the belt.

## Portable Power Squeezer

Recently there has been placed on the market by the E. Killing's Molding Machine Works, Davenport, Iowa, a new portable power squeezer. This type of machine is made in several sizes and is adapted for all classes of snap flask work, making both the cope and the drag in one operation. The 10-in. size is shown in the accompanying

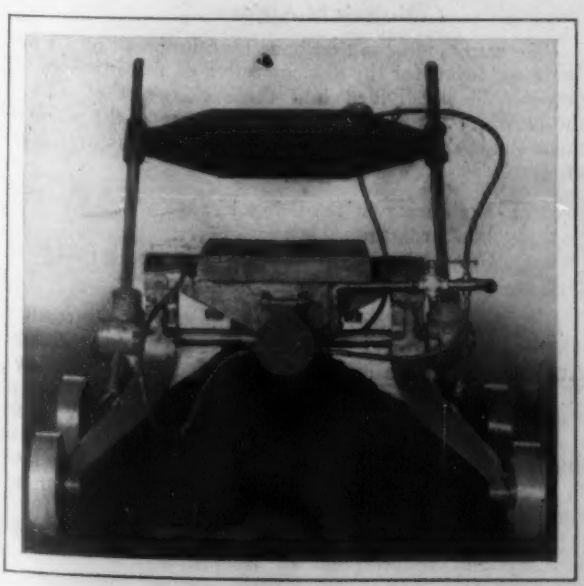


Fig. 1—A New Type of Portable Power Squeezer Built by the E. Killing's Molding Machine Works, Davenport, Iowa

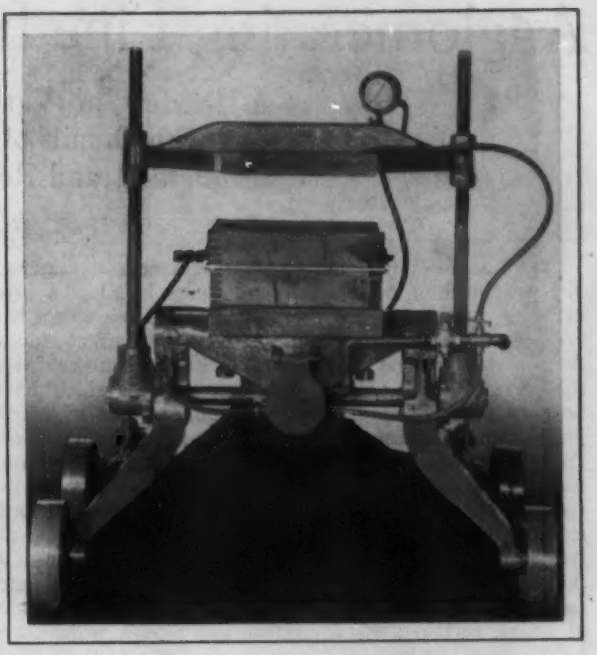


Fig. 2—The Machine with the Mold in Place Ready for Squeezing

engravings, Fig. 1 being a view of the machine with the cross head thrown back. Fig. 2 illustrates it with a snap flask in position on the table ready for ramming.

As will be noticed from the engraving, the machine is mounted on four wheels and can be moved along the floor readily and thus follow the sand heap as the day's work progresses. The base of the machine is wide, and ample room is provided for the operator to move about without being interfered with by any of the machine parts. The cylinder and the yoke trunnions are supported at a sufficient hight to prevent them from coming in contact with the sand heap. Lock nuts are provided to prevent the plunger from being blown out. The equipment of the machine includes a blow-off valve and a knee vibrator as well as an air gauge for regulating the pressure desired for the different classes of work handled.

## The Fitzall Nut and Pipe Wrench

The nut and pipe wrench manufactured by the Standard Wrench & Tool Company, Providence, R. I., contains new and unusual features. It is a very simple tool, having but three parts and no screw, the principle of the inclined plane or wedge being applied to procure the desired results. The upper jaw is solid with the handle. The wedge-shaped lower jaw is controlled by the yoke or sleeve.

The adjustment is accomplished by a forward pressure of the thumb on the sleeve which carries with it the lower jaw until the nut or bolt is gripped in that position. Pressure on the handle bar immediately locks the lower jaw

One Type of the Fitzall Wrench

in place. The harder the pressure the stronger the hold. After locking the jaw a requisite amount of play remains so that a new hold may be taken on the work with no further adjustment. A slight jarring on the wrench unlocks the set of the lower jaw. On the back of the handle is a stop, a part of the forging, the purpose being to prevent the sleeve from striking the jaw and wedging. The pipe wrench has interchangeable tooth blocks on the upper jaw, which is slotted to receive the tongue of the block, this being further held in place by a pin. The lower jaw is smooth and receives no wear. This wrench is made in all of the regular sizes.

# Agglomerating Fine Iron Ores and Flue Dust*

## A Review of Various Methods Now in Use with Details of the Gröndal Process of Briquetting and Results with Its Product

BY N. V. HANSELL

The last few years have shown an increasing interest in the subject of beneficiating iron ores in all iron producing countries. In the United States this movement has been slower than in certain of the European countries, the obvious reason being the abundance and relative cheapness of the Lake Superior iron ores which have been an effective hindrance to the development of enterprises that have for their object the preparation of low grade ores for the iron industry. Gradually conditions have changed. The world's consumption of iron is increasing enormously. Being in 1900 about 40,000,000 tons, in 1910 it was already 60,000,000 tons. And there is no reason to doubt that in the near future the increase in the iron consumption will continue at the same rapid rate, especially with the development of such parts of the world as China, certain parts of Africa, and others, which have hardly been touched yet by modern industrialism.

### High Grade, Easily Accessible Ores Limited

It is therefore not surprising that concern is felt that the known available iron ore resources of the world are gradually being depleted. Signs of this feeling are the recent investigations in this country under the direction of the Geological Survey of the iron ore resources of the United States, and particularly that by the last International Geological Congress of Stockholm, Sweden, of the iron ore resources of the world. These investigations have emphasized the fact that the known high grade ore deposits are limited in their extent and that they will at no distant future be exhausted, compelling the iron industry to depend for raw material on the enormous deposits of low-grade ore which are distributed over almost all the world. The fact that new deposits of high-grade ore will be discovered in countries not yet thoroughly explored will not materially change the prospect. The rôle such new deposits will play in the future can of course not be forecast. Transportation difficulties will probably exclude a great part of them from being used at present centers of the iron industry.

### The Problem of Low Grade and Fine Ores

In view of these facts it is no wonder that great interest is displayed in the subject of making useful such ores as have heretofore been discarded because in their natural state they are not suitable for blast furnace operations. Among such ores are, in the first place, those whose low iron content precludes their direct charge in the furnace, so that they have to be crushed and concentrated, giving in result a finely granulated product with high iron content; in the second place, those which, although their iron content is sufficiently high, by either their physical or chemical character are less desirable.

Modern blast furnaces with their high stacks and high blast pressure make difficult the employment in the burden of too high percentage of dusty or finely granulated ore, as, for instance, some of the fine Mesaba ores. At some furnaces conditions compel the management to use 60 or 70 per cent. of such ores; indeed, I am told of furnaces using 100 per cent. fine ores. But the manager will without incitement tell his woeful tale of unavoidable losses of the charge in the form of flue dust, of scaffolding in the furnace, and frequent explosions. The fine ore, descending more quickly than the rest of the charge, reaches the smelting zone only partly reduced. This causes disturbance in the furnace operations, with frequent casts of off iron. Therefore, if it can be economically done, it is highly desirable to convert to a lump form all such fine ores, whether they have been obtained in the form of fine concentrates in the separation of low-grade iron ores or mined as natural soft and fine ores. A high sulphur content in the fine ore is often an additional reason for a preparation of it by agglomerating, as usually thereby the sulphur content is reduced and the ore is made doubly attractive to blast furnace managers.

### The Value of Flue Dust Now Wasted

In this country, however, the real impetus to the development of processes of agglomerating fine iron ores has not been the desire to make useful such fine ores as just mentioned, but rather the necessity of finding some method of preparation of such waste products as flue dust, pyrites residues, etc., for blast furnace use. The most important of these is the flue dust, of which it is stated that between 2,000,000 and 3,000,000 tons are annually produced in the United States. A part of this is recharged into the furnace after a thorough wetting, which is supposed to prevent its being directly blown out again. That this practice is not very satisfactory is evident from the vast and growing piles of this material around furnace plants in the Middle West, where a high percentage of soft ores is used in the burden. This waste is especially great when a furnace has been long in the blast and begins to be somewhat rough in the lining. The flue dust contains from 35 per cent. to 45 per cent. metallic iron, with 5 per cent. to 20 per cent. of coke. Figuring with a value of the original ore at the furnace of, say, 7c. a unit, the intrinsic value of the so-called waste material is probably about $3 per ton. Low iron prices with a necessity for the blast furnace manager to economize has brought to light this leak, through which often as much as 10 per cent. of the ore charged goes for naught.

So also with the pyrites cinder, of which material yearly about 500,000 tons is produced; and on account of its usual pulverous condition and high sulphur content has been thrown away or perhaps at the best used for reclaiming land or building roads, although it frequently contained as much as 55 or 60 per cent. of iron. The modern methods of making useful for the iron industry through agglomeration either these waste products or these low grade ores, in their natural state unsuitable for blast furnace operation, certainly form a not unimportant phase in the present movement for the conservation of natural resources.

### Methods of Agglomeration

The many methods that have been proposed or are now being employed for the agglomeration of fine iron ores can properly be subdivided into three classes, the bases of the classification being radical differences in the processes themselves, and also to some extent in the nature of the products:

1. Nodulizing in revolving kilns.
2. Blast roasting.
3. Briquetting with or without binder, usually followed by a heating of the briquettes.

1. Nodulizing gained early prominence in this country. There are at present a number of plants in operation. Among these is the pioneer one at Hackensack Meadows, N. J., treating pyrites cinder. Others like the ones at Lebanon, Pa., Benson, N. Y., and Standish, N. Y., treat ore concentrates. Others again, like the Hubbard plant in Ohio, treat flue dust. The most modern plant of the kind is at Felton in Cuba, which was described in the Transactions of the Institute, 1911, by J. E. Little.

In Germany, similar methods are being used for the roasting and sintering of carbonates, and in Canada a plant of four kilns is now being erected for the same purpose. For such ores as decrepitate and shrink consid-

*A paper read at the New York meeting, February, 1912, of the American Institute of Mining Engineers.

erably in roasting, the method is especially valuable. The product is, however, seldom uniform. Occasionally the nodules are vitrified and very dense, occasionally they are loose and brittle, producing much dust in handling. Difficulties in keeping the kilns free from scaffolds or rings, necessitating shut-downs every eight or 10 days, tend to make the cost of production higher than a first investigation of the merits of the process seem to indicate.

### Sintering with Blast

2. Blast Roasting. It is not necessary to dwell at any length on this process, which has been described admirably in the Transactions of this Institute by Mr. Dwight and Mr. Gayley. The product is spongy and forms undoubtedly an excellent raw material for blast furnace operations.

### Conditions of Successful Briquetting

3. At a meeting of the Iron and Steel Institute in 1910, Chevalier C. De Schwartz, of Liege, read a paper on the briquetting of iron ores. In this he gave as conditions for successful briquetting:

1. The iron ore briquettes must have a certain resistance against mechanical influences. They must resist a pressure of not less than 2000 lb. per square inch, and when dropped from a hight of 10 ft. on a cast-iron plate they must not fall into dust, although they may break into pieces.
2. They must resist heat. Heated to 900 deg. C., they may commence to sinter, but they must not disintegrate into small fragments.
3. They should be capable of being placed in water for a certain time without softening.
4. They must resist the influence of steam at 150 deg. C., without crumbling.
5. They must possess a certain amount of porosity in order to allow the carbon monoxide in the blast furnace to penetrate the interior of the briquette, and to exercise its beneficial reducing influence.
6. The binding material, if any is used, should not contain noxious substances (sulphur, arsenic) to such an extent as to be injurious to the quality of the pig iron produced.
7. The cost of producing briquettes should not exceed the difference in the prices between lump ore and fine ore.

In other words, the briquettes must be able to stand handling, transportation, and storing in the open air without too much disintegration, and to withstand conditions as they exist in the upper part of a blast furnace without crumbling into dust. In addition, they ought to be easily reducible. If a binder is used, it ought to be of such a nature that it adds no deleterious elements and it ought not to lower the iron content of the material too much. On the question of the cost of operation any process will stand or fall. In figuring this, it must be recognized that the value of a process cannot be determined by the briquetting cost alone. The value of the finished product and its influence on the cost of pig iron manufacture must be taken into consideration. For the preparation of a briquette which is easily reducible with a low consumption of coke, one can afford to pay more. Really, therefore, the question has a wider scope than at first appeared. The use of an easily reduced briquette makes possible a greater output of the blast furnace. Presently, I will give figures which will verify this statement and will show that it is not enough to convert the fine ore into lump form and consider in selecting a method only the direct cost of the briquetting.

### Various Methods for Various Conditions

Of the great number of methods which have been devised, several of which have gained commercial prominence, some are better adapted to certain classes of ore than others. This is natural, as the processes have originated and have been worked out at places where necessity has called for them. Mr. Schwartz in his paper describes a briquetting process used at Kertsch, Russia, and Ilsede, Germany, where the ores are of a clayey nature, with 6 to 8 per cent. of hygroscopic moisture. The ore is pressed into bricks at a low pressure, 4000 to 5600 lb. per square inch, and heated to a temperature of only 75 deg. C. The use of higher pressure would make the briquettes too dense. Parallel cases can be cited from other places. A high sulphur content in the ore, for instance, gives prominence to a method by which the ore in the briquetting is heated sufficiently for an effective roasting.

To describe even the main features alone of the various briquetting processes that have come into commercial use in Germany, for instance, would take me too far away from the real subject of my paper. I refer anyone interested to G. Francke's "Handbuch der Brikettbereitung" (Stuttgart, 1910). But I wish to mention some of the more successful in order to compare them with the Gröndal method, which it is my intention to describe.

### The Problem of a Binder

The various briquetting processes can advantageously be classified as those that use a binder and those that do not. It is a very practical distinction. There can be little question that a binder used to cement together the ore grains fills the voids between them, producing a briquette with low porosity. This must have an unfavorable influence on the action of the briquettes in a blast furnace. The more porous an ore or a briquette is, the less coke is required to reduce it. This is obvious, as in the upper part of the blast furnace the ascending gases penetrate the porous briquette, and deposit fine carbon through dissociation throughout it, causing a direct reduction of it before it has reached a great depth in the stack. The binder also lowers the iron content of the briquette. In most cases 8 to 10 per cent. of the binder is employed that the smelting and slagging of this material increases the fuel consumption and makes the pig iron more expensive is quite natural. I could give figures illustrating my point, but do not think it necessary.

Of the various binders, those most in use seem to be of the nature of hydrosilicates, which are hardened either by exposure in air a long time or by being treated with steam under pressure. Deutsche Brikettierungs Gesellschaft advocate a method of this kind. They form with the binder a silicate of lime. The Scoria Gesellschaft of Dortmund uses 8 to 10 per cent. basic blast furnace slag, or a mixture of 4 per cent. slag with 4 per cent. CaO. The ore is ground with the binder, pressed into briquettes, and hardened in steam. The Weiss method is to mix the ore with 5 or 6 per cent. of hydrated lime, form the briquettes at a pressure of 4500 lb. and expose them to the influence of $CO_2$ gases, first cold and then hot, at 300 lb. pressure. The Tigler process (Duisburg Meiderich) employs a binder consisting of 6 to 8 per cent. of slaked lime, sometimes with an addition of 1 per cent. of blast furnace slag. The Schumacher process for flue dust utilizes the hydraulic properties of the flue dust which, like cement, contains lime, alumina, and soluble silica ready for combination. By the addition of a small amount of chloride of magnesium, chloride of calcium, or certain other salts, good briquettes can be obtained. The flue dust ought to be used hot direct from the dust catchers.

Among organic binders many have been tried, but few have been satisfactory. Trainer uses 4½ per cent. zellpech, which is a waste lye resulting from the manufacture of sulphide of cellulose. This and similar binders coke in the upper part of the blast furnace stack, and thus continue to hold the fine ore together until a reducing zone in the furnace is reached. They are, however, generally too expensive to be used.

Of methods without binder, I will mention the one known under the name of Ronay. For the binder is substituted high pressure in hydraulic presses. The process has been more used for metal filings, etc., than for ores. The briquetting of clayey ores without a binder has already been mentioned. In reality the clayey constituent of the ore serves as a binder, deposited with the ore by a kind Providence.

### The Gröndal Process

The only process of importance that remains to be spoken of is the Gröndal, which consists of the briquetting of fine ore at a medium pressure and the burning of the briquettes at a high temperature in a specially constructed channel furnace.

It was in 1899, when Dr. Gustav Gröndal was manager for Pitkaranta Iron Works in Finland, that he built his first channel kiln for the briquetting of iron ore concentrates. Similar kilns had been used previously for the burning of clay bricks, but for the adaptation of the process to the treatment of iron ores and for the gradual development of a modified type of kiln suited to this special purpose, the honor belongs to Dr. Gröndal.

The first kiln at Pitkaranta was an entire success, and a good deal was written about it in the contemporary technical press of Europe. It was followed by one at

Bredsjö, Sweden, built in 1902. From that time on, a great number of kilns have been built both in Europe and in this country. At present, there are 16 plants in Sweden with together about 35 kilns and a briquetting capacity of about 400,000 tons a year. In Norway, there are three large plants: Sydvaranger with eight kilns, Salangen with four kilns and Dunderland with four. In England 12 kilns have been built, all treating pyrites residues and "blue billy." Italy has one plant, Spain has two, and in the United States there are six plants in operation or construction. In Canada the first one is being built by Moose Mountain, Ltd., for the treatment of magnetite concentrates.

### The Furnace

The Gröndal furnace can briefly be described as a channel furnace, through which the ore, pressed into bricks, is transported on flat cars, which form a continuous movable platform through the furnace. The furnace is heated by means of gas introduced through the raised arch at a distance from the entrance end of about two-thirds of the furnace length. The flat cars are usually built of structural steel with firebrick tops and are furnished on each side with flanges dipping into sand troughs. They are often built with over-lapping ends so that when they are pushed against each other in the kiln, they separate completely the upper part of the kiln, through which the gases pass, and the lower part, in which are the trucks and the wheels. The furnace walls are built double, with an outside wall of red brick and an inside one of firebrick; the two being separated by an air space, which assists in lowering heat losses by radiation, and at the same time permits the walls to move independently of each other in expanding and contracting on account of changes in kiln temperature when the furnace is started and stopped.

For obtaining the necessary temperature, almost any kind of fuel that has sufficient calorific value can be used. In Europe, the rule has been to use producer gas, except at some places in Sweden where the furnaces are built at iron works. There a mixture of blast furnace gas and producer gas is burnt. Blast furnace gas alone is too diluted, so that the high temperature required for the reaction cannot be obtained unless it is enriched by some producer gas. When it is available, however, it is economical, as the coal consumption in the gas producer can thereby be cut almost in half. In this country, crude oil is used at two plants and natural gas at two. Local conditions govern the choice of fuel.

For different fuels and for different ores the construction of the kiln must be somewhat modified, although broadly the design is governed by the same principles. In the first third of the kiln the briquettes are preheated by the escaping combustion gases; they pass through zones of increasing heat as the cars are pushed forward. In the combustion chamber the heat is maintained at about 2500 deg. F. When the briquettes have passed the combustion chamber, they gradually pass through the cooling chambers, into which cooling air is blown by means of a fan. When they leave the furnace they are cooled off sufficiently to be unloaded directly into railroad cars. The arch over the cooling chamber is double, and in some installations it is made of corrugated cast iron plates. Through the space between the double arches the air that is to be used directly for the combustion passes. On reaching the burners or the combustion chamber it has a temperature of 400 deg. to 600 deg. F. The outgoing combustion gases, when reaching the stack flue generally have a temperature of 350 deg. to 500 deg. F. It can be seen that the furnace is built on the regenerative principle and that its heat efficiency is good. The walls, as has been said, are double, and the arch is usually covered with 8 in. or 10 in. of sand, so that radiation losses are low.

### The Chemical Reactions

Having thus given the general principles in the design of the furnace, I wish to describe the chemical reactions which take place during the passage of the ore through it, before giving details of the practical operation. As a rule, regardless of their original composition, the briquettes are discharged as a peroxide of iron ($Fe_2O_3$). If the ingoing ore is a hematite, it is gradually dissociated to $Fe_3O_4$ as the ore passes towards the combustion chamber. In a nearly white hot condition, it is here met by a current of highly heated air. This gives the ideal conditions for a rapid conversion from $Fe_3O_4$ to $Fe_2O_3$. Here lies the secret of the Gröndal process. Briquettes at a temperature of 2400 deg. or 2500 deg. F. are met by air of high temperature. The oxidation is almost instantaneous. Thereby an appreciable amount of heat is liberated, to the benefit of heat conditions in the combustion zone.

A quick oxidation of the $Fe_3O_4$ produces a blue crystalline $Fe_2O_3$. A slow oxidation will give a product that is earthy, amorphous and reddish in color. From this it is clear that it is necessary to keep a high temperature in the combustion zone. The color and condition of the discharged product tell whether the furnace is run properly. Dark blue, firm and strong briquettes indicate a right temperature; loose and reddish briquettes, a temperature too low.

When the ingoing material is a magnetite, it is probably oxidized to a certain degree on its way toward the combustion zone. This oxidation is probably followed by a dissociation as the briquettes enter the hotter part of the furnace; but the $Fe_3O_4$ so formed is again oxidized to $Fe_2O_3$ before being cooled off and discharged. This last re-oxidation is so complete that analyses usually show over 90 per cent. $Fe_2O_3$ of the total iron oxide in the briquette.

### Physical Effects of the Chemical Reactions

It is probably these chemical reactions which account for the agglomeration and the great strength of the briquettes. The material is not rolled together when in plastic state, as in the nodulizing process; nor fused together as in the blast roasting, which gives a sintering product usually of little strength; but in the re-oxidizing of the lower oxides of iron, diminutive crystals of hematite are formed, growing out on the surface of each ore grain in the briquette. These small crystals interlace with each other or grow together, forming a strong bond between the grains. If the ore is not crushed fine enough or consists of rounded pebbles, the intergrowing effect may not be obtained, and consequently the resulting briquettes will be loose and easily disintegrated. Such was the case in tests with the concentrated product from St. Lawrence magnetic sands. It was found necessary to pass a part of the iron sand through a grinding mill in order to get some fine material to fill the voids between the larger pebbles. With pyrites residues there has been the same experience. It is futile to try to briquette cinder from lump pyrites without first grinding it so as to pass, say, 20 mesh, if strong briquettes are desired.

It has been mentioned that the briquettes in passing through the furnace are desulphurized. The conditions in the furnace are favorable to a complete desulphurization: a high heat, a strongly oxidizing atmosphere, and a porous material consisting of finely granulated ore particles, permitting the gases to reach every diminutive ore grain. In addition, the material stays in the hot zone for several hours, permitting a gradual oxidation of the sulphur, which escapes in the form of dioxide with probably a small amount of trioxide. At Bayonne, N. J., cinder with 2 or 3 per cent. sulphur is discharged with about 0.03 per cent.

### The Briquettes in the Blast Furnace

A number of tests on Gröndal briquettes have been made in order to ascertain their suitability for blast furnace and open hearth use. I will mention the results of only a few of them.

Last year a low grade magnetite was crushed and concentrated in a large commercial test. A part of the concentrate was briquetted at Bayonne. Of the product about seven tons was shipped in an open bottom dumper car to Youngstown, Ohio. Here they were dropped, in unloading from a trestle 30 ft. high, on an iron floor. A screening test of the unloaded material gave through a half-inch screen 8.84 per cent. of the total mass. These fines gave the following results at the sieve test:

| | | |
|---|---|---|
| On 8 mesh | 69.70 per cent. | |
| On 20 mesh | 16.66 per cent. | |
| On 40 mesh | 4.55 per cent. | |
| On 60 mesh | 0.81 per cent. | |
| On 80 mesh | 0.80 per cent. | |
| On 100 mesh | 0.60 per cent. | + 0.06 per cent. |
| Through 100 mesh | 6.66 per cent. | + 0.16 per cent. |
| Total | 99.78 per cent. | + 0.22 per cent. |

This shows that the total amount of fines passing through 40-mesh after the briquettes had been dropped 30 ft. on an iron floor is only 0.8 per cent.

A regular compression test on the same briquettes showed that they would withstand a pressure of 5221 lbs. per square inch. That in handling they form a very small amount of dust was shown by the following test. A number of briquettes were crushed to ¼ in. and less in a Gates crusher. A sieve test of the crushed material gave only 10 per cent. through the 100-mesh sieve, and very little on the other fine sieves.

The porosity of the briquettes, being the ratio of voids to the total volume of the briquette, is always over 20 per cent. This is a strong point in their favor, as it aids in making them easily reducible in blast furnace operations.

### The Use of Briquettes

Recently I noticed a paper read by John Jermain Porter at the meeting of this Institute of last June on "The Fuel Efficiency of the Iron Blast Furnace." He said among other things:

> The great desirability of having an ore which is easily reduced by carbon monoxide rather than by solid carbon, and in addition is reduced at such low temperature that the resulting carbon dioxide has no solvent power, has been frequently pointed out. The importance of carbon deposition in this connection does not, however, seem to be so generally appreciated. It will be recalled that this reaction, $2CO = CO_2 + C$, begins at about 430 and ceases entirely at 900 deg. That is, it takes place near the top of the furnace. It is probable that very little of the carbon resulting from this reaction ever reaches the hearth, but it does useful work in reducing the carbon dioxide of the limestone and in removing that portion of the oxygen of the ore which has not been removed by carbon monoxide higher in the furnace. From this point of view it appears that the ability of an ore to induce carbon deposition is equally important as the ease with which it loses its oxygen. . . . . Every pound of carbon deposited means a saving of a pound of fuel for the hearth.

He also gives some numerical factors of reducibility for various classes of ores to be used in formulas for finding the fuel efficiency of the blast furnace. These figures indicate that the Mesaba ores are most easily reduced. In his list thereafter appear brown hematite, soft red hematites and roasted carbonates, hard red hematites, Clinton "hard red" ore and magnetites and mill cinders, the last two being those that require most coke for their reduction.

By my description of the physical and chemical character of the briquettes produced by the Gröndal method, I think I have been able to show that the briquettes have all the qualities of an ore that can be reduced in the blast furnace with the least coke. The briquette is porous, so that by the dissociation of the carbon monoxide in the upper part of the stack the fine carbon is deposited throughout its mass. Furthermore, the briquette is a hematite and therefore does away with the usual and, as can be seen from Mr. Porter's figures, well-founded objection by blast furnace managers to the use of a too large percentage of magnetite in the burden.

### The Saving from Briquetting in Sweden

It is the rapid reduction of the briquettes in the blast furnace that has made them so popular in Sweden. From 25 to 50 per cent. of briquettes in the burden of charcoal blast furnaces of that country has been demonstrated to reduce the charcoal consumption per ton of pig iron by 15 to 25 per cent. Fifty per cent. of briquettes in the burden gives the best charcoal economy. In Sweden 500,000 to 600,000 tons of pig iron is produced yearly. As 300,000 to 350,000 tons of briquettes are reported for the same time, containing in average 64 per cent. iron, which corresponds to about 200,000 tons of pig iron or about one third of the total pig iron production of the country, this means a yearly saving for the country of 400,000 cubic metres of charcoal, an item of importance in these times of increasing scarcity of wood suitable for charring. If such a tremendous saving can be made in charcoal furnaces, it is not too much to believe that an appreciable saving in coke furnaces can be obtained.

### Reduction in Fuel Consumption

I have figures from a furnace in Belgium which has been using imported Swedish concentrate briquettes in a mixture with calcined Bilbao Spathic ore. With 70 per cent. of briquettes and 30 per cent. Bilbao ore in the burden, the coke consumption was reduced to 1760 lbs. per ton of pig iron. With all Bilbao ore it had been 2398 lb. The iron content of the Bilbao was 50 per cent.; of the briquettes 65 per cent. The output of the furnace was increased 20 to 25 per cent., with a corresponding saving in wages and general charges.

From this country I have no definite figures. The briquettes produced here have been used in such small lots at various plants that no valuable data have been obtained. I have been recently informed, however, that at Mayville, Wis., the coke consumption in the blast furnace is considerably reduced by their use. The briquetting plant there has been in operation so short a time that it is too early yet to expect authoritative figures.

For use in open hearth furnaces, the briquettes are eminently fitted, being rich in iron, free from noxious substances, in lump form and of sufficient weight to sink through the slag cover.

### The Moisture Content of the Ore

The fine ore to be briquetted has to have such a moisture content that it maintains its brick form after pressing. Too much moisture affects badly the work of the presses; too little makes the briquettes dusty and causes considerable spilling in pressing. The proper percentage of moisture varies with the hygroscopic qualities of the ore. Concentrated magnetites have to be dewatered to 8 or 9 per cent.; fine pyrites cinder can have 15 to 18 per cent. and still give good results. The tempering is done in the simplest manner by a sprinkling pipe or a water hose. The man who watches the feeding of the presses soon learns by the feeling of the ore whether it has the right moisture content.

The delivery of the ore to the presses is in modern plants made by mechanical means at a small expense. In most of the present installations, drop presses of a Dorstener type developed by Dr. Gröndal are used, but on account of their usually rather high upkeep cost, toggle presses of heavy construction will probably be substituted in new plants.

### Varying Sizes of Briquettes

The standard size of the briquettes is 6 x 6 x 2½ in., and two tiers are loaded edgewise on each car, so that the load stands 12 in. high. At the Duquesne plant, briquettes the size of standard red brick—2½ x 4½ x 8 in.—are made and are loaded three or even four tiers high. In loading them on the cars care is taken to place them so that the gases can penetrate the load and heat the bottom row as thoroughly as the top one. The loading is done by hand, and constitutes the only hand labor around the plant. This is, however, so laid out that the work is as much facilitated as possible. The pressman removes the briquettes as they are delivered by the press and places them on the car, which is pushed close to him. He does not need to move from his place during his work, and although he handles only 10 or 12 lb. each time he turns, he can place 30 tons in a 12-hour shift. The press delivers from 12 to 16 briquettes each minute, so that enough idle time is allowed for changing cars. The endeavor now is to eliminate this labor, which, it must be admitted, is quite strenuous and, with wages of about $2.10 per day, accounts for 7 to 10 cents of the briquetting cost of each ton.

### Kiln Construction and Practice

The loaded cars are pushed through the furnace at intervals, one car being admitted at a time. This pushes the others forward so that the first one is discharged from the furnace. The pushing is done either by a hydraulic ram or some similar contrivance; it requires exceedingly little power. The discharged car is unloaded either by being pushed under a plow, which scrapes the briquettes over the sides of the car or by being tipped endwise. Either arrangement can be made entirely automatic; so that in a four-kiln plant two men take care of all the cars as they come out, unload them, and send them back to the presses via a return track with endless chain haulage. The frequency with which the cars are charged depends upon the nature of the ore. If it has a high sulphur content it may be necessary to charge them at a slower rate than if the sulphur content is lower. At Mayville cars are charged every 10 minutes. The furnaces there are 195 ft. long and the cars 6 ft. 6 in. Each furnace therefore contains simultaneously 30 cars, which require, as one is pushed in every

10 minutes, 5 hours to pass through. At Bayonne, the furnace is only 143 ft. long. One car is pushed in every 18 minutes, so that it takes 6½ hours to pass through.

The length of the furnaces, which is quite different in the Mayville and Bayonne plants, depends upon the nature of the ore to be briquetted. The width has been gradually increased. To begin with, it was not more than 3 ft. In this country both 5-ft. and 6-ft. furnaces are used, and foundations are now laid for two having an inside width of 10 ft. Plans are drawn for furnaces even 15 ft. wide, and I see no reason for not having even a greater width than this. A wide furnace with a capacity of, say, 300 tons of briquettes per 24 hours will show a still greater heat economy than present plants. The developments of the process are going in this direction.

Simultaneously improvements in the design of the kiln are introduced in every new installation, in order to strengthen details that in previous plants have been found unsatisfactory and in order to reduce upkeep cost. Good results in these respects have been attained. The kilns themselves will stand for years without the walls or the arch having to be touched; the repair cost on cars amounts to only a few cents per ton. Mechanical labor-saving devices are introduced everywhere, so that labor cost is being lowered.

Fuel consumption is low. In plants treating magnetic concentrates, the amount of coal used in the gas producers averages 7 per cent. of the weight of the briquettes, and there are plants in Sweden using as little as 5 per cent. At a plant in this country where pyrites residues are briquetted and crude oil is used as fuel, the oil consumption is stated to be 15 gal. per ton, which corresponds to approximately 10 per cent. It is obvious that if the ore is heavy, as magnetic concentrates are, the relative percentage of fuel used will be lower than when ore that contains a great amount of combined water and other volatile matter is treated. With such ore, a shrinkage in weight of 15 to 20 per cent. has to be taken into consideration.

# The Proposed National Eight Hour Law

## Protests Against the Bill to Limit the Labor of Mechanics and Others Employed on Government Work to Eight Hours a Day

The Senate Committee on Education and Labor heard testimony last week from representatives of manufacturing interests in opposition to the bill limiting the labor of mechanics and others employed on Government work to eight hours a day. Without exception, those who appeared asserted that the men in their employ desired to work the full limit of 10 hours a day, preferring the extra money to the shorter hours. It was also asserted that the effect of the law would be to put all manufacturing plants that did even a minimum of Government work on an eight-hour basis, and that as a result these establishments would refuse to contract in future with the Government, nothwithstanding they would be pleased to have the work.

### Arthur T. Waterfall, Detroit, Mich.

The first speaker, Arthur T. Waterfall, Russel Wheel & Foundry Company, Detroit, Mich., said:

"The company I represent is opposed to this bill for the reason of its impracticability in conducting our business on Government work, although we do not do very much of it, and because of the inability to work two classes of men, one working eight hours and the other 10 hours. In placing orders for material on Government contracts we necessarily have to conform with the Government specifications as to tests, which are within very narrow limits necessarily, and of a high grade, and where perfect accuracy in compliance with the specifications is demanded.

"In doing so the people from whom we would buy a portion of these products become under the terms of the act subcontractors. In taking up an inquiry relative to whether we would be able to get this material we find that they are not desirous of becoming subcontractors. It would be up to us to procure the material in such a manner as we could, and we do not see how we are going to do it.

"In taking up the matter with our employees I personally have asked more than a score whether they would work eight hours a day and accept eight hours' pay in the shops where they were working 10 hours, and I have been treated with derision and informed that 'we want 10 hours' work and 10 hours' pay'; that the expense of living is such that eight hours' employment and eight hours' pay would not permit them to stay longer in our employ under these conditions.

"The amount of Government business we have done has in 10 years varied from 10 per cent. in certain years down to one per cent. last year. While we value the Government business that comes to us in competitive bids, we would, if this bill were passed, be reluctantly compelled to avoid bidding on Government work. In Detroit, where we are located, 50 hours a week in summer and 59 in winter is almost the universal rule and it seems to meet with great favor with the 70,000 employees in that city."

### Justus H. Schwacke, Philadelphia, Pa.

Justus H. Schwacke, manager and secretary of William Sellers & Co., Inc., Philadelphia, Pa., said:

"Our objection to this bill is founded on the same reasons that Mr. Waterfall has advanced and it would affect us in the same way. We know from long experience that it is absolutely impracticable to work two gangs of men or a part of the men on different hours. The whole system of work in the shop is one of interlocking, and it would be impossible to set aside in advance a certain number of hours during the day upon Government work and a certain number of hours upon private work, ten-hour work.

"We work in our shops, and have for many years, 10¼ hours for five days in a week and on Saturdays, up to within 10 or 15 years ago, we stopped at 4:30 p. m. Men liked to work in our shop 10¼ hours a day, stopping only three-quarters of an hour at noon for six days, in order to get off at 4:30 on Saturday. So we gradually went to 10¼ hours for five days in the week and five hours on Saturday.

"We avoid, if possible, overtime. This is a principle with us. We do not believe it is a good thing to ask men to work after they have worked 10 hours a day. If for any reason we find it necessary to get away an important machine on Saturday, our men, rather than work on Saturday afternoon, will work all day Friday or Friday night and up to Saturday noon. I mention this to show that the men will voluntarily work overtime.

"I believe, from a long series of records, that our men are not in the slightest degree impaired by the hours that have existed in our works, that is 10¼ hours a day. Our statistics show that 25 years ago, while fewer men were employed, the loss of time from whatever cause was considerably more than it is at present. It is reasonable to conclude from this that present hours of labor in our establishment do not impair the working ability of the men.

"During the last 15 years there has been a tendency to eliminate or gradually reduce hard manual labor. Such a thing in our establishment, and in thousands of others, is practically unknown. In our shops our men do no hard manual labor; it is all done for them. The work is put into his tool and it is taken out of it by a power crane of some kind. Even the movements of the tools, which years ago were made by hand, have all of late years been provided with power devices for doing the handling.

The consequence is that the men, after working 10¼ hours in the shop are really fresher at the end of it than they would have been 15, 20 or 25 years ago working the eight hours that then existed.

"Government work in our shops varies from less than one per cent. to two or three per cent. If the question of working for the Government, under the conditions imposed by this bill, should present iself to us we should have to abandon Government work altogether. We do not wish to be deprived of the opportunity of doing Government work, for our relations with the Government are of the pleasantest character. We do a high grade of work that I believe the Government needs. While the loss to us would be small, it would be very severe to the Government if the same position was assumed by all the other builders in our line, and I don't see how it is possible for the other builders to do otherwise than take the same position."

### Donald Tulloch, Worcester, Mass.

Donald Tulloch, secretary of the Worcester, Mass., Labor Bureau, said:

"In connection with our work in Worcester we have a free employment bureau for the express purpose of giving a place for workmen to come without paying any fee for getting a position. In the past five or seven years there have been over 10,000 who have come annually into that office. During the time when they are seeking employment I usually talk with them somewhat in regard to the various conditions of trade, the opportunities for work and for advancement, and in so doing I have had an opportunity to find out whether or not they would wish to work eight hours or 10 hours a day.

"These men, who are skilled mechanics, knowing perfectly well they could not get the same pay out of an eight-hour day that they would get out of 10-hour day, have no desire to come down to an eight-hour day. They are perfectly satisfied to work 10 hours a day. They are glad of the opportunity to work up to 59 hours a week and are glad to get the privilege of working overtime.

"The sanitary conditions of the shops in connection with the National Metal Trades Association membership, Worcester Branch, are practically model. There has been no strike in Worcester in the machine line for 10 years, and I believe this is due to the fact that the members of the association endeavor to treat their help as it ought to be treated."

### Joseph Wright Powell, Philadelphia

Joseph Wright Powell, representing the William Cramp & Sons Ship & Engine Building Company, Philadelphia, said:

"If this bill becomes a law, we must either put our entire works on an eight-hour day or we must give up doing Government work. For the last two years we had been unable to bid for battleships for the United States Navy because of the provisions inserted in the appropriations act that limited the hours of work on these vessels to eight hours a day. I don't see how it is possible to operate a part of our plant on an eight-hour basis and the rest on a 10-hour basis.

"The bill as it stands handicaps the output of our plant in practically the same ratio that it decreases the hours. Some of our large tools represent an investment for a single tool of as high as $50,000 and the tool is productive just as many hours as it operates. If we can run that tool 10 hours a day, we will get just 20 per cent. more out of it than if we run it eight hours. While it may in some cases be possible to increase the time that the tool is operating by putting on extra shifts of men, that entails extra expense in many ways that would probably result in the long run in its being about equally bad whichever method we follow.

"The shipbuilding industry represents a capital of more than $50,000,000, and not one yard has paid a dividend since 1901, with one exception, and this was work in a special line. In other words, $50,000,000 in capital has been paying labor $200,000 a week and the capital invested has not had one cent in return. At the present time the Cramp Company and its allied companies are working 10¼ hours for five days in the week and five hours on Saturday. The general disposition of our workmen is to make all the overtime they can. We pay, of course, the usual premiums for extra work. To shut off the right of the workman to work such hours as he chooses is not only to take away from him an important means for obtaining extra compensation for his services, but it comes, from our point of view, pretty near to interfering with rights that we think ought not be controlled by legislation."

### James Morpeth, Providence, R. I.

James Morpeth, superintendent Brown & Sharpe Mfg. Company, Providence, R. I., said:

"We do not do a good deal of Government work. It comes along with our regular work in such a way that it would be quite a problem to pick out the Government work from our regular work. Stopping this work at four o'clock would entail quite a loss. A good deal of the work would be held up in the case of the machines that should be going on that would be stopped. If the men that are doing that work should be sent home they would protest against it.

"We employ about 4000 men. Last winter we ran part of the works for nine hours a day. We lost quite a number of men from that part of the plant on account of their not wishing to work merely nine hours. They would rather work 10 hours and get more pay. In regard to overtime, we do not wish any one to work overtime. That is the last resort. But I find, a great many times, that men almost scheme to work overtime. In other words, they save up a job.

"We have about 80 men that have been with us 25 years or more. Two men have been with us more than 50 years. We have 200 apprentices, and we have a school, and apprentices get four hours a week at this school. We take into our place a great many men that are not mechanics and teach them. We would rather do that—take a man that we know has something in him, than take a man that is well versed in some particular line. A great many of our men like to work overtime and they would like us to start up a machine for all night and let them sleep in the day and come down and work at nights to get extra pay. Some men have built homes in that way, by means of that extra pay. We give every man a chance to improve himself.

"Another thing: We lend the men such money as will help them. Sometimes their wages are attached and it is hard for them to give out two weeks' pay so we lend them some money and take $1 a week out of their wages until it has been paid for. No interest whatever is asked. It is a great help to a great many men. In order to get out good work and do it well a man must be happy. Then you will get good work and you will have a loyal man. He will not join any organization of any kind unless he sees you about it. If this bill becomes a law we should fight shy of Government work. We do, I believe, from one-half to one per cent. of work for the Government."

### G. L. Markland, Philadelphia

G. L. Markland, of Philadelphia, Pa., said:

"The ultimate outcome of this bill, if it becomes law, will be to put the whole country on an eight-hour basis. The cost of living now is so abnormal, considering the wages possible to the working people, that the effect would be to lower even the present wage rate. What is going to be the result when we cut down the 10-hour day to eight hours? Suppose a man gets 37 cents an hour; We have to divide that by eight and pay him that much an hour; but you do not get so much work in the day. Things usually run by the day, though we charge by the hour.

"Suppose the Government buys automobile ambulances and they need repairs. They cannot buy the stuff in the open market because usually the automobile ambulance is made to special specifications furnished by the Government's draftsmen or mechanical engineers. You have to go back then to the man who manufactured your automobile ambulances or you will have to take the blue prints for the parts to other gear people, of whom there are about 50 in the country, employing in the neighborhood of 3000 men. Suppose in our case the Government wants the part made of chrone-nickel steel. We ask the Midvale Steel Company for some steel for gears for a Government automobile. This means eight hours' work, assuming that this bill becomes a law. The Midvale people will say: 'We cannot bother with that; it is too small a mat-

ter. It amounts only to about $30 worth, the steel that you want to buy.' The result is that we cannot take the contract. Who else is going to take it? The steel man will not run his plant eight hours a day. He has to have his fires going all the time, 24 hours a day.

"We have another thing that is up just now. The Government is now trying a rawhide roller for ammunition loading. Under this bill the people who put up the rawhide from which we turn out gears, or from which these rollers are turned out, would have to run their plant eight hours a day. The man they buy their hide from would have to run his plant eight hours a day. We would have to run our plant eight hours a day. On this roller there are also a brass bushing and the brass flanges. The brass foundryman, therefore, would have to run his plant eight hours a day. The result would be an eight-hour law for the whole country. We are kicking about the price of steak and the price of real estate and the price of car fare and of freight rates and every other thing that goes to make up our daily life, and by this bill we are going to make those prices even higher.

"Of course the percentage of steel manufactured by the steel makers of our country and going into Government work is very small. I cannot see what is going to be the outcome if this bill becomes law, because we certainly will not take any Government work. We do now about from three to five per cent. of our work for the Government. We run 55 hours a week. At the present time we are very busy, running overtime two nights until 10 o'clock. We run on the premium plan and pay our men an average of 35 cents an hour. Some of them get 37 cents, some 39 cents and some 28 cents."

# An 18-In. Heavy Motor-Driven Lathe

## A Recent Development of the Bradford Machine Tool Company, Employing a Geared Head

Departures from the existing standards of lathe building characterize the new 18-inch heavy pattern quick-change gear lathe with a geared head and motor drive which has been recently brought out by the Bradford Machine Tool Company, Cincinnati, Ohio. One of the special features of this new tool is the shortening of the headstock by doing away with a complicated combination of sleeves, shafts, segment gears, levers, hand wheels and slow running gears engaged by frictions as well as the placing of the motor on the base at the rear of the machine. In this way it is pointed out that topheaviness and vibration have been practically eliminated and at the same time a compact machine has been secured A front view of the new lathe is given in Fig. 1, and Fig. 2 is an end view showing the location of the motor as well as the small number of gears at the end of the headstock.

It will be noticed by referring to the accompanying engraving that the location of the motor results in an economy of space while at the same time by reason of its low down location topheaviness and vibration have been almost entirely done away with. The mechanical feed changes are all available instantly and the lathe is started, stopped or reversed without delay in the same way as any belt-driven tool by a similar shifter rod running the full length of the lathe and at all times within easy reach of the operator. For a large variety of lathe work eight spindle speeds are considered ample by the builder who recommends a constant-speed motor for this work, although it is pointed out that the ideal conditions are realized in the use of an adjustable-speed motor having a range of 1½ to 1 with a simple starting and regulating rheostat that furnishes an indefinite number of speeds. Either type of motor runs in one direction only, the lathe having a mechanical reverse.

### The Machine in Detail

In designing the lathe an effort has been made to have the operator employ the most efficient speed at all times by grouping the speed controlling levers in a very convenient manner. Eight spindle speeds are available, four being secured by a selective type automobile speed box and this number is doubled by the lever on the head which is moved to either the right or the left. When the lathe is running the lever on the speed box is automatically locked, thus preventing breakage of the gears. All of the speeds are plainly marked on the speed plate and the positions of the speed box lever and that on the head to get any of these are clearly indicated.

The lower shaft of the gear box is extended to the left and is connected with a short countershaft driven directly by a pinion on the end of the motor shaft by a pair of gears and also by a pair of Morse silent chain wheels, friction clutch members which engage either the gear or the chain drive being furnished. These clutches are also connected with the long shifter handle, an arrangement which enables the lathe to run in either direction and also provides a quick brake stop for working up to shoulders. The shifting of the gears under load is prevented by a shot-bolt in positive connection with the main clutch operating lever. It will be noticed that the peripheral speed of the gears is low, all parts are easily accessible and special attention has been given to lubrication.

The first driving shaft in the geared head is a short shaft carrying a Morse chain wheel and a gear wheel which are connected with a chain wheel on the upper end of the gear box shaft and a friction clutch controller gear on the main

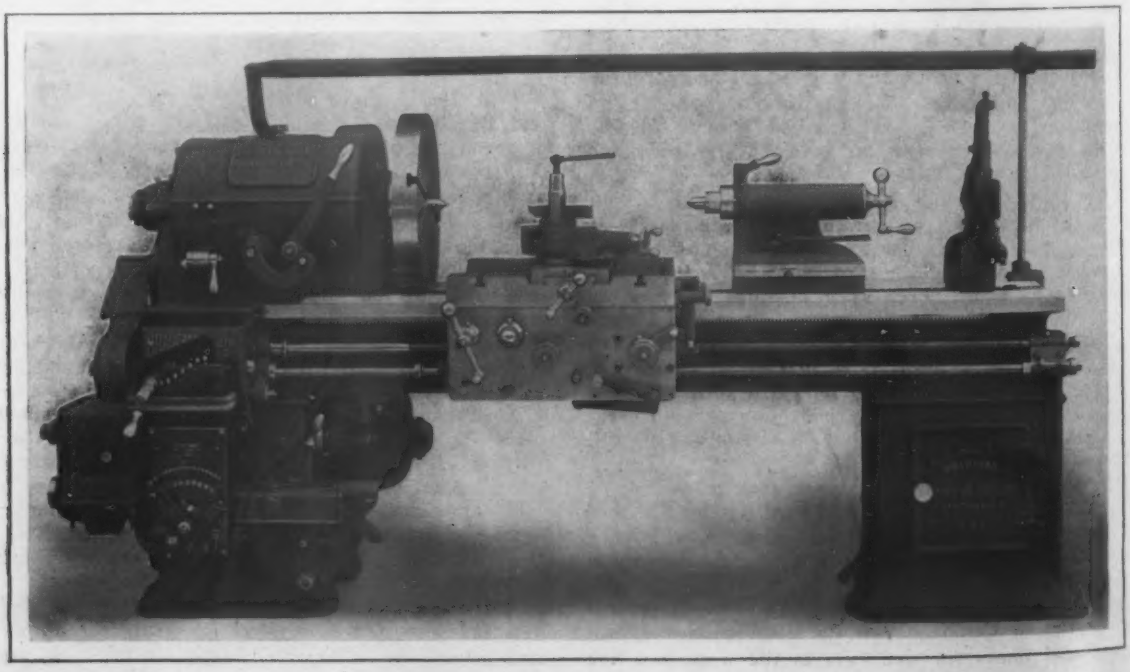


Fig. 1—A New 18-In. Heavy Pattern Quick-Change Gear Lathe Built by the Bradford Machine Tool Company, Cincinnati, Ohio

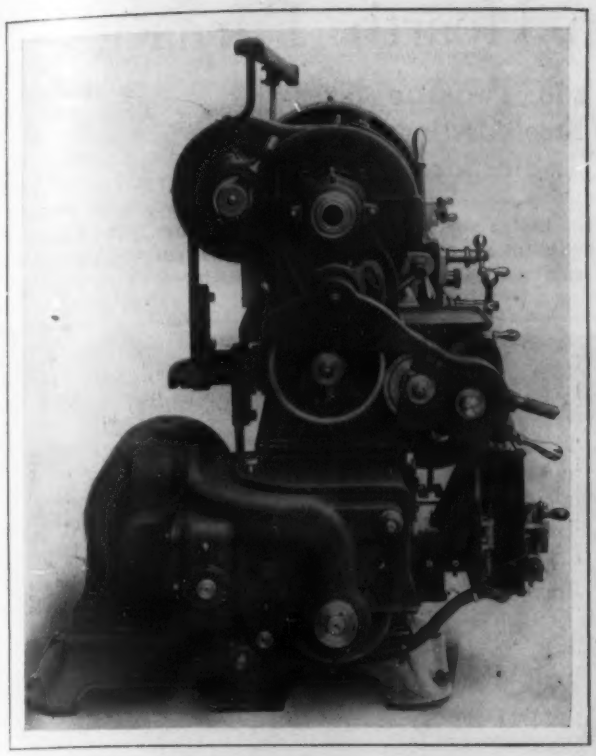


Fig. 2—An End View Showing the Arrangement of the Motor, Gearing, Etc.

spindle. This latter gear is in driving connection with another on the back gear shaft which carries another gear, that in turn is connected to the lathe spindle through a second clutch controlled gear. The lever on the head controls the friction and the positive clutches which engage the high and low speed gears with the spindle respectively, all supplementary speeds being secured through the regulating rheostat which is located immediately below the quick change gear screw cutting mechanism shown in Fig. 1.

The builder's well-known type of quick change gear device is employed. This gives a practically limitless range of feeds and all standard and pipe threads including an 11½ per inch can be cut. One lever is all that is needed to secure these various changes. The drive from the spindle to the lead screw is very direct and it is not necessary to remove any of the gears. Forged steel gears are used and change gears of the ordinary type can be used directly between the spindle and the lead screw for cutting odd threads. An automatic stop for longitudinal feeds is regularly provided, the ratio between the feeds and the threads being 4½ to 1. A thread indicator and chasing dial form a part of the apron's equipment. When not in use the wormwheel on the chasing dial is swung out from the lead screw to an inoperative position by a cam and knurled knob, thus avoiding all unnecessary wear of these parts. As will be noticed from the engravings gear guards cover all the exposed gears and afford protection both to the operator and to the machine.

The spindle is of high carbon crucible steel, bored entirely through and turned true with the hole. It is mounted in adjustable taper bronze bushed bearings and extends through the hood, the thrust collars running in an oil bath. Extra weight and depth characterize the bed. In the construction of this part an unusual thickness of metal was employed. It is webbed in 2-ft. sections and it is emphasized that it will not spring while taking very heavy cuts. An overhanging tailstock is regularly furnished which permits the use of the compound rest at right angles when turning between short centers. It can be set over for turning tapers and it is emphasized that the clamping arrangement has been especially designed to secure rigidity when work of this nature is being done. The compound rest is gibbed solidly throughout and has ample wearing surfaces and a base graduated in degrees. The tool post is furnished with a ring and wedge or a threaded collar as may be ordered and a plain or other type of rest can be supplied if so desired. The carriage has a full bearing on the V's throughout its entire length and is gibbed, back and front. There is a wide cross V with an ample amount of metal in the cross bridge. The apron is of the regular double-plate pattern with a device to prevent the simultaneous engagement of the feed rod and the lead screw. All the feeds can be reversed in the apron. A single-section steel rack is used and the pinion meshing with it can be disengaged for cutting screws. The lead screw is cut from a master screw and is not splined, a feed rod being furnished which can be used for feed purposes and thus save the lead screw and the nut. The latter which is of phosphor bronze is of the split pattern.

The feeds cover a wide range from very coarse to very fine. All of these are positively geared through the feed rod and can be instantly engaged or disengaged. The feeds provided include a friction cross feed graduated to read in thousandths of an inch, friction traverse feed in the apron and automatic stops for the carriage which can be placed in any desired position on the feed rod.

The following table gives the principal dimensions and specifications of the lathe:

| | |
|---|---|
| Swing over bed, in. | 20¼ |
| Swing over rest, in. | 11 5/8 |
| Swing over carriage, in. | 13¼ |
| Distance between centers, 6-ft. bed, in. | 29 |
| Dimensions of front spindle bearing, in. | 3¼ x 5 1/16 |
| Dimensions of rear spindle bearing, in. | 2½ x 3¼ |
| Diameter of hole through spindle, in. | 1 11/16 |
| Diameter of spindle nose, in. | 2¾ |
| Length of spindle nose, in. | 2 11/16 |
| Length of threaded portion of nose, in. | 1 15/16 |
| Threads on spindle nose, U. S. Standard | No. 6 |
| Ratio of back gears | 7.31 to 1 |
| Travel of cross slide base, in. | 8 |
| Travel of compound rest, in. | 6½ |
| Diameter of tailstock spindle, in. | 2¼ |
| Travel of tailstock spindle, in. | 8 |
| Diameter of lead screw, in. | 1 7/16 |
| Number of lead screw threads per inch | 4 |
| Minimum number of threads cut per in. | 3 |
| Maximum number of threads cut per inch | 46 |
| Minimum spindle speed, adjustable-speed motor, r.p.m. | 8 |
| Minimum spindle speed, constant-speed motor, r.p.m. | 12 |
| Maximum spindle speed, r.p.m. | 398 |
| Power required, hp. | 5 |
| Minimum motor speed, r.p.m. | 500 |
| Maximum motor speed, r.p.m. | 1,000 |
| Weight of 6-ft. lathe, without motor, lb. | 3,900 |
| Weight of bed per foot, lb. | 150 |
| Boxed shipping weight of 6-ft. lathe, without motor, lb. | 4,400 |

The regular equipment of the lathe includes large and small face plates and steady, follow and compounds rests together with the necessary wrenches. The builder's improved taper attachment which turns tapers up to 4⅛ in. per foot is furnished as an extra. This attachment is graduated and is available for the full distance between the centers and can be furnished with the lathe or at any time after purchase as the back of the carriage is drilled to receive it. If desired the lathe can be arranged to be driven by a single pulley directly from the lineshaft instead of by an electric motor if the shaft is suitably located. Both the motor-driven and the single pulley lathe are made in the 22 and the 26 in. sizes as well as the one illustrated.

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**Preparing Materials for Tests or Analyses.**—Advice on preparing samples of materials for tests or analyses is given in an unusual pamphlet printed for general distribution by the Henry Souther Engineering Company, Hartford, Conn. It is a recognition of the problem which confronts the factory or the workshop in ascertaining what form a given sample should take in submitting it to a laboratory for investigation. It is therefore felt that the compilation of the suggestions will be found especially useful by works' purchasing and engineering departments. Among the subjects covered are methods for sampling steel and nonferrous metals; for securing an analysis of pig iron, iron castings, coal, coke and lubricating and cutting oils. Diagrams are given of the proportions of test pieces for the determination of the physical characteristics of different metals.

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The Apollo Sheet Steel Company, Apollo, Pa., has been formally organized with Robert Locke president and general manager, and Charles B. Wolfe secretary and treasurer. The company has applied for a charter with an authorized capital of $300,000, and it is stated that $225,000 of this amount has been subscribed. The company proposes to start work very soon on the erection of a 6-mill sheet steel plant.

# A Detachable Open-Hearth Furnace

## Its Use in One-Ton and Two-Ton Sizes for the Manufacture of Steel Castings—The Furnace Used as a Ladle for Pouring

In an article by W. M. Carr in *The Iron Age* of February 11, 1909, a description was given of a small open-hearth furnace, using fuel oil, which Mr. Carr had devised for use in the production of steel castings. The furnace body, more or less cylindrical, was entirely separable from the ports. To avoid the trouble with slag in lip

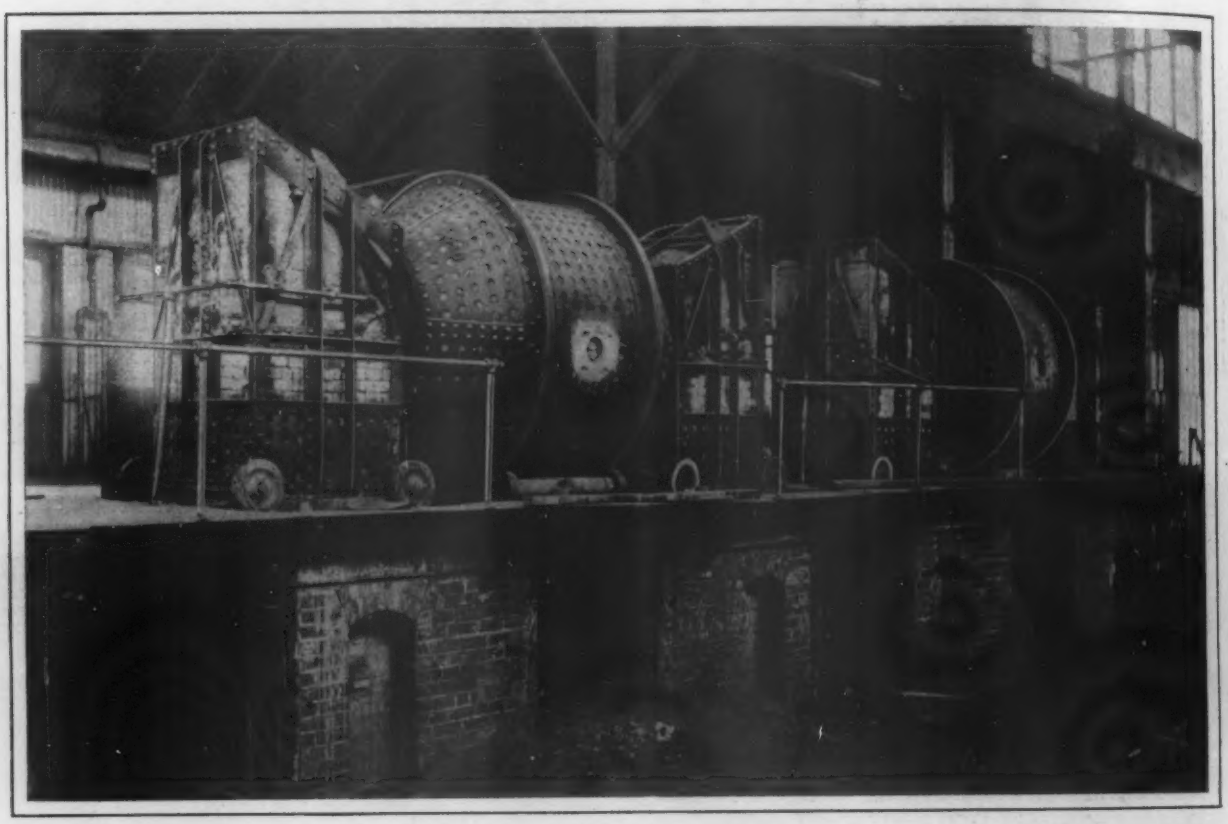

Fig. 1—Front View of Carr's Detachable Open Hearth Furnace

Fig. 2—Charging Platform of Detachable Open Hearth Furnace

pouring, the furnace was fitted with a nozzle and stopper, worked through the charging door and set in place long enough before tapping to permit of heating the stopper fittings. It was proposed, if desired, to carry the furnace to the molds, pouring directly into them, thus giving a combined melting chamber and pouring ladle.

In the past two years Mr. Carr has brought his small detachable open-hearth furnace to a working basis at the Glenova, W. Va., plant of the Alloy Steel Casting Company, Wheeling, W. Va., of which he is general manager. Views illustrating the operations at this plant are given herewith. The furnaces shown are of one to two tons capacity per heat (as against 500 lb. capacity in the original experimental furnace) and they are producing steel of a standard quality, the metal going into automobile parts and general machinery castings of both plain and alloyed steels. The general construction and operation are evolved on the principle of securing on a small scale all of the advantages of the usual large capacity open-hearth furnace with its simplicity of operation, uniformity of product and the opportunity of complete control. It is known that a volume of steel of one to two tons produced by open-hearth methods involves some little risk in chilling, thereby causing some misruns of castings of light, thin-

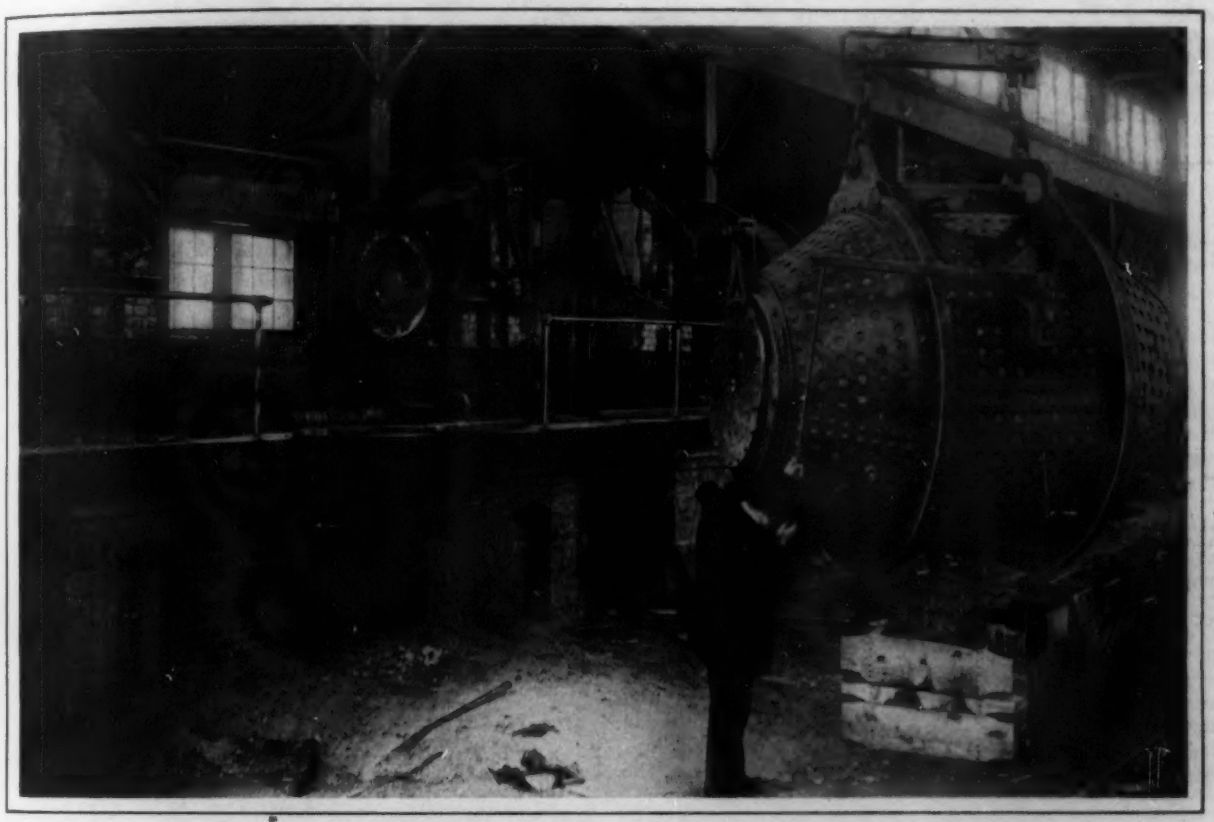

Fig. 3—Two-Ton Detachable Open Hearth Furnace in Casting Position

Fig. 4—View of Foundry Floor of Alloy Steel Casting Company, Where the Detachable Open Hearth Furnace is in Use

sectioned parts, as would occur where a ladle is used to transfer the metal from the furnace to the mold. In the newer installation shown the use of the ladle is dispensed with. The furnace at tapping time is lifted away from its port connections and the metal poured directly from it into the molds. The flow is controlled by the nozzle and stopper fittings referred to above, fixed in place shortly before tapping. In this way the initial temperature of the metal is preserved and small castings are made which heretofore have been considered out of the reach of ordinary open-hearth foundries.

The inventor states that the furnaces can also be used for the manufacture of tool steels of crucible compositions, doing away with the heavy costs of crucible and producing a metal of a high grade, of uniform composition and a satisfactory casting temperature. The claim of uniformity is based on the fact that the volume of steel being small permits a proper distribution of the various ferro-alloys which may be added to give the different compositions. While definite data as to cost of operation are not given, Mr. Carr says that they are less than those of the small Bessemer or the crucible process and that the figures compare well with standard open-hearth practice. He gives the following details concerning the practice developed at the Glenova foundry:

The furnace body being detachable, very little time is lost in the case of repairs, the plan being to have on hand spare lined shells for immediate substitution. The time then saved is a distinct advantage over the usual type of open-hearth furnace, which would be idle during the period of general repairs. In this case the damaged part is removed and immediately replaced with a newly lined one.

The installation of furnaces of this type is best adapted to small steel castings and light intermittent tonnages of castings varying from 500 lb. down to ounces per piece and in outputs varying from 1 ton to 10 tons per day. This type is also recommended for the manufacture of malleable iron castings of light weights and small tonnages. Summarizing, the advantages claimed are these: 1. Moderate first cost of installation. 2. Lowest operating costs (excepting only the large capacity open-hearth furnace). 3. Low cost of repairs. 4. Avoidance of skulls and ladle expense. 5. Extremely hot fluid metal of standard open-hearth composition. 6. Rapidity of operation. The average time of a two-ton heat is three and a half hours.

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**Moving Pictures of Tin Plate Making**—The Follansbee Brothers Company, Pittsburgh, has had moving pictures taken of its plant at Follansbee, W. Va., showing from start to finish the processes used in the manufacture of tin plate. These pictures were first shown at local theatres in Cleveland during the convention of the Ohio Hardware Association and later at Albany, N. Y., during the convention of the New York Retail Hardware Dealers' Association. There are three reels with about 3000 ft. of films. It is the intention to show these pictures throughout the country. Thus the sheet metal workers can be made familiar with the best practices in making tin plate, as it is impossible for many of them to visit the mill.

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Bids for ingot iron, steel and cast iron pipe for some 9000 ft. of a 66-in. sewage outlet for Rochester, N. Y., were received on March 13. For both the steel and ingot iron pipe the T. A. Gillespie Company, New York, was low bidder, offering to do the work for $265,254 if steel pipe is used and $330,032 if ingot iron is used. One other contractor bid on both types of pipe line, Houston Barnard, Rochester, N. Y., and his bids were $321,644 for the steel pipe and $349,406 for the ingot iron. Two bids were received for cast iron pipe, and Hiram W. Phillips, Quincy, Mass., was low at $405,164.

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Harvey H. Brown & Co., the Stewart Iron Company, Ltd., the Brown Steamship Company, the Northwestern Transportation Company and the president and treasurer of the Brown Hoisting Machinery Company have removed their offices from the Perry Payne Building to 1624 Rockefeller Building, Cleveland, Ohio.

# Electric Arc Welding*

## The Application of This Process to Steel Castings

BY B. M. BOWERS

Electric arc welding is the fusion of two metals by electrical means, simply by allowing them to melt, then to mix and unite as they cool. This method of welding should be regarded as a trade, as it can only be acquired by careful study and gradual development from simple to difficult jobs. The operator should understand the expansion and contraction of the metal he is about to weld, and use a hammer freely, in order to relieve any strain occurring in the casting by the sudden heating of the arc. This is undoubtedly the secret of a high tensile strength in a weld, rather than the material melted into the defect. Blacksmiths usually make good electric welders, which is probably due to their experience with fire welds, the heat treatment of tools, etc.

The low cost and rapidity with which this process can be applied place it first among methods of repairing defects in castings. The possibilities of this process to repair blow holes, sand spots and checks, weld on lugs and burn off fins, gates and risers, have resulted in saving many castings which would otherwise be condemned. Of course, good judgment should be used in all cases. Too much confidence should not be placed in the process, as it must be remembered that electric welding is equal only to about 60 per cent. of the original strength. In one or two instances, 85 and 90 per cent. efficiency has been obtained, but this could not be repeated, as a rule, and, therefore, should be considered as possible but not probable at all times. Nevertheless, I believe that with careful study and further investigation it will be possible to attain 100 per cent. or more of the original strength.

The real cause for this low efficiency appears to be oxidation, caused by the excessive heat of the arc. This is somewhat reduced by the use of the metallic electrode, which reduces the amount of current; but as this method is very slow and hard to master, it would not be advisable to recommend it for general foundry use.

### Description of Apparatus Employed

The following is a brief description of a simple electric welding apparatus, which is easily constructed at little cost and serves equally as well (so far as actual welding is concerned) as the current supplied from the generator set designed especially for such work.

The apparatus consists of a rain barrel or suitable tank, two steel plates, carbon or electrode holder, and enough flexible cable to connect up. The steel plates are suspended in the barrel or tank, into which a proper amount of water impregnated with common salt has been placed. One plate is connected directly to the negative side of a direct current line, ranging in voltage from 110 to 550, while the carbon or electrode holder is connected to the other plate, with a flexible cable of suitable length, to allow free manipulation of the electrode.

The casting or piece to be welded should be grounded or connected to the positive side of the line. By adjusting the steel plates submerged in the bath, a current of almost any amperage can be obtained.

Next in construction is the carbon electrode. A piece of ¾-in. wrought iron pipe, 18 in. long, is threaded at one end to carry a ¾-in. socket. Into this socket a pair of steel clamps are placed to hold an arc carbon 1 in. in diameter and 6 in. long, tapered to a point.

The clamps holding the carbon are firmly secured in the socket by several light taps of the hammer. A wooden handle is then made to fit over the pipe, near the center, to protect the operator from shock and heat. At the other end of the pipe, two ¼-in. holes are drilled and tapped, about ¾ in. from the end and ¾ in. apart, to hold the negative terminal wire. Above all, the operator must protect his eyes and skin by wearing a mask or hood over his head, made of canvas, tin or aluminum, with an eye-piece, containing suitable colored glass. About two pieces of each color are sufficient. The eye-piece may be 6 in. long and 2 in. wide and extend about 1 in. from the mask. Care should be taken that the brightness of

*Read before the Associated Foundry Foremen of Philadelphia March 12.

the arc does not strike the operator's eyes or face, as such rays produce painful irritations. The operator should also protect his hands and wrist by wearing gauntlet gloves of pig-skin or buck-skin. Next, the operator must have a material to weld with, which for steel castings must be a soft steel wire, about 5/16 in. in diameter, and to be from 0.07 to 0.10 carbon.

### How the Apparatus Is Used

The operator is now ready for work. Bringing the carbon electrode in contact with the metal to be welded and instantly withdrawing it to a distance produces the hottest flame known, by which the metal can either be fused, molded or melted away entirely, as desired. While the arc is drawn, the welding material is fed in slowly. The welding should be done in an inclosure, so as not to interfere with any other workmen in the vicinity, on account of its penetrating rays. Vigorous hammering should accompany each weld.

Probably the greatest difficulty experienced in electric welding is the prevention of chilled welds, ordinarily known as hard welds. This trouble is due to the sudden chilling of the metal and at times affords difficulty in machining or filing. To avert this trouble the operator, before melting any metal, should allow the arc to play on the spot to be welded for a few seconds, so as to preheat the surrounding metal, thus storing a certain amount of heat in the casting to be welded, which, when finished, will cool off more slowly.

Blow holes are usually clean and free from sand, and submit to welding easily. Sand spots must be thoroughly cleaned and all foreign matter removed before starting to weld. Checks or cracks in castings should be burned out, by tilting the casting and applying the arc, allowing all melted metal to run off by gravity. After they are burned out to the depth of the check, they should be reheated in a forge fire, expanding the check to its maximum, then, while red hot, welded quickly and hammered while cooling.

For burning off scabs, fins, gates or risers, a current from about 400 to 500 amperes should be used, if any speed is desired. With the above amperage, a riser 4½ in. square can be cut off flush in less than five minutes, at a cost of about 8 cents. The arc-carbon should be pointed, thus concentrating the flame to a small point, which is very essential for either welding or cutting away metal.

### Practical Suggestions

The following are a few suggestions, which should be observed to attain good results:

All castings of any importance should be preheated in a suitable forge or fire, and welded while red hot, and not allowed to come in contact with any drafts, rain or moisture, as this often causes hard welds.

Reheating the castings after being welded is detrimental, as it forms minute checks throughout the weld. This has been proved by the microscope.

The arc should be as long as possible, as the excessive heat is, no doubt, the cause of the pronounced oxidation so common in welds. It is only reasonable to assume that if the temperature of the arc were reduced, the oxidation would also be reduced accordingly. This can only be accomplished by drawing the arc to very near the breaking point. A reduction in amperes would not reduce the temperature but simplify the volume, the temperature remaining the same.

The welds should be made with the least possible number of applications of the arc. The arc should be given a rotary motion of the hand, so as to heat as large an area as possible, instead of concentrating it to one spot, which crystallizes the metal, leaving it hard and brittle. At times a suitable flux is essential. The theory in connection with its use is that any carbon which may have been introduced into the weld, from the carbon electrode, will unite with the oxygen in the flux, to form a carbonic gas, leaving pure iron. If, however, this gas is not eliminated, it will cause sponginess in the metal.

The most common flux is borax. The use of borax simply tends to prevent oxidation by excluding the air. Better results will be obtained if the water of crystallization, of which borax contains nearly 50 per cent., is first removed. This can be done by melting the borax in a graphite crucible until it is free from bubbles, then pouring it out, allowing it to cool, and finally pulverizing it.

When welding brass or bronze, the metal must be supported in such a manner that the shape will be retained. The arc should be applied at a low voltage, and for a very short space of time; otherwise these metals, on account of their comparatively low fusing points, would be melted away.

The metallic electrode which has been previously mentioned can be used on thin cross sections, where tensile strength is essential.

In conclusion, it might be mentioned that electric arc welding covers a field entirely of its own, being quite different from incandescent or oxy-acetylene welding, neither of which can infringe with advantage upon it.

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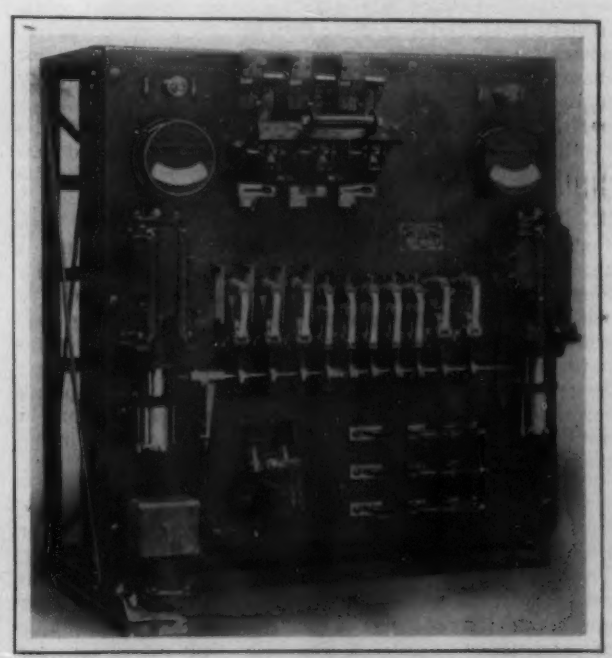
## Automatic Fire Pump Starter

The increased use of alternating-current motors for pumping service has led the Cutler-Hammer Mfg. Company, Milwaukee, Wis., to add several alternating-current types of fire pump starters to the line of direct-current starters at present built. These starters are of the combination type and provide for both automatic and manual starting of the motor. One of the largest alternating-current fire pump starting equipments ever built was recently installed in the Northwest power station of the Commonwealth Edison Company, Chicago, Ill., and is illustrated herewith.

This starter is employed in connection with a 225-hp., 220-volt, three-phase, 60-cycle slip-ring induction motor.



A New Type of Fire Pump Starter for Use with Alternating-Current Motors Developed by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

This motor drives a centrifugal pump having a capacity of 2000 gal. per minute at pressures ranging from 135 to 150 lb. per square inch. As soon as the pressure in the fire line falls on account of the tapping of a hydrant or the opening of sprinkler heads, the automatic pressure regulator starts the pump. If it is desired to make a test, the handle shown at the left of the panel can be employed to start the motor, the same set of butt-contact switches being employed in this case as well as when the starting is automatic. It is emphasized that no adjustments are necessary to change the starter from automatic to manual operation or vice versa.

The starter is installed in a splash proof sheet-iron case, and the controller itself is moisture proof. The bare iron parts of the ordinary controller have been replaced by phosphor bronze and copper plated iron parts. The slate panel is 5 ft. wide, 5 ft. high and 2 in. thick.

# The Flourishing German Steel Industry

## An Interesting Report on the Trade Situation—Prospects of the Renewal of the Steel Syndicate—Difficult Problems To Be Solved

BERLIN, March 7, 1912—A special correspondent of the Frankfurter Zeitung has recently been traveling through the iron districts making a thorough study of the trade position and the outlook for the renewal of the Steel Works Union (Stahlwerks Verband). An abstract of his report will doubtless prove of interest to readers of *The Iron Age*.

He found the mills everywhere running at their full capacity, and iron men generally in a very optimistic frame of mind. A great transformation in the trade situation has occurred since October 1, such as nobody anticipated earlier in last year. When this correspondent made a similar study of the iron trade in February, 1911, he found the belief quite general that there would be no great boom, although the works would continue to run on good orders but at low prices. The great improvement that has occurred since the settlement of the Morocco question has therefore come as a surprise to everybody.

### The Substantial Basis of the Boom.

The state of employment with the mills is splendid; the great establishments have work ahead for months; and, according to the general opinion, the demand is not speculative but real. There is a steady demand from abroad. Total exports last year reached 4,770,000 metric tons, or more than one-third of Germany's entire production, while in some lines, like wire, more than half the product was exported. Total exports last year were 1,180,000 tons greater than in 1909. The South American markets took largely increased amounts last year. The trade is building hopes upon a great demand for iron and steel in China as the result of the revolution there; and it is also believed that Turkey and Italy will again become good buyers after the war in Tripoli closes.

The foreign trade is now on a much better basis than for a long time. Foreign buyers are so plentiful and are so anxious for iron and steel products that manufacturers no longer feel it necessary to make special prices in order to sell abroad and thus earn something toward meeting general expenses. Foreign buying has grown so active as to have become the principal factor in determining prices; hence the great difference between home and foreign prices formerly complained of has been sharply reduced, and in not a few cases completely wiped out. The outlook in the home market is regarded as equally good.

### The Shipbuilding Industry Very Active

The chief influence in expanding the home demand for iron and steel has come from the shipbuilding industry. The German commercial fleet is about to undergo a great enlargement. The Hamburg lines alone had on January 1 not less than 412,000 tons of new steamer capacity in course of construction or ordered, comparing with 197,500 tons for January, 1911, and only 48,700 tons for January, 1910. There is, consequently, a quite unusual demand for ship plates, and orders run beyond the end of the year. Several of the plate mills are enlarging their capacity. There is also a big demand from the shipyards for rivets and other supplies. The prospective further increase of the navy and the military establishment also opens up great business hopes for the iron industry; and there will also be heavy orders from the Prussian railroad authorities for materials for new railroads and rolling stock. Large canal-building operations are going on; and much work is in progress or in prospect with municipalities and provinces.

The new Pig Iron Syndicate is working successfully, but not much money will be earned on pig iron this year. Large orders were brought over from 1911, taken at very low prices; and, besides this, the prices of both ore and coke have been raised. Shipments of semi-manufactured steel are very large, and last year nearly 40 per cent. of it was exported. The numerous fusions—for example, of tube and wire mills with steel companies—will henceforth reduce the Union's sales of half-rolled steel. Steel rails and structural material have profited less from the present prosperity than some other lines, like bars and plates. The foreign demand for bars is heavy, and export prices of 110 marks, free on board at seaport, are now paid, with delivery dates three or four months ahead. Sharp competition in wire and wire nails prevails since the dissolution of the trade organization last summer, due to the attitude of American participants in the international arrangements; and, although there is no lack of work, it has to be taken at unsatisfactory prices. This is also true in the tube trade.

### Some Problems To Be Considered

The correspondent then raises the question as to how matters will stand in the steel trade after the big new establishments now building shall have begun production, and after the Union shall have been renewed (if, indeed, it be renewed at all) with a large increase of allotments. When the organization was renewed five years ago, a period of overproduction, especially in bars, followed owing to the heavy increase in allotments. Nobody wants to be reminded of that fact to-day, however; optimists in the trade, on the other hand, take the view that these big new works cannot begin production at once, but only gradually, for there are not workmen enough to supply their wants, while so far as the demands for larger allotments are concerned, this only corresponds to conditions already actually existing. There are mills actually producing as much as 60 per cent. above their allotments in bars, and this notwithstanding the fact that they must pay a penalty of 23 marks per ton on every ton sold in excess of allotments. The allotment claims are not too heavy, argue the optimists, for the market is now absorbing quantities far above the present aggregate allotments. For example, the Pig Iron Syndicate has recently taken over the entire product of one of the great new establishments, without being able even then to meet the market demands. It is believed, therefore, that the growing requirements of home and foreign markets will make it possible to sell all the output represented in the allotment claims.

### Some Troubles of the Steel Syndicate

Prospects for the renewal of the Steel Works Union are then broadly discussed. The correspondent found the common opinion in the trade to be that the various establishments would quarrel sharply among themselves, but that they would finally come to an agreement, with the friendly assistance of the banks. A nearer view, however, shows that there are serious difficulties in the way of prolonging the combination, and that the sentiment for continuing it is by no means so favorable as in times of less satisfactory business conditions.

The general idea held hitherto is to make no increases whatever in allotments in Class A products (semi-manufactured steel, rails, and structural material), but to carry all applications for increases to Class B (bars, plates, rods, tubes, castings and forgings). The logical explanation for this view is that the Union maintains the prices of Class A, and the mills accordingly make their greatest profits in such products; but the sales in this class do not even now come up to the existing allotments, particularly in rails and structural shapes; only semi-manufactured materials exceed allotments. There is, therefore, no possibility of increasing allotments in this class; and if increases are made to some establishments, this can only be done by curtailing the allotments of others. But none of the mills would consent to a reduction. Moreover, if some mills plead their right to increases on the ground that they have enlarged their capacity such a plea could be put in by about all of them, for there is hardly a single company that has not added to its capacity. For this reason it is proposed by the older establishments in the Union to grant no allotments in Class A to the three great new concerns (Thyssen's at Hagendingen, Gelsenkirchen's at Esch, and the new Burbach works). But these companies will not

continue in the Union unless their claims for allotments are granted.

That is one point at which interests conflict in the Union. Still another is in respect to heavy broad-flanged beams. At present the Deutsch-Luxemburg Company holds the American Grey patents for making such beams, and it claims such big allotments in them as would amount to giving it a monopoly of the market. A number of other concerns, however, assert that they are also able to manufacture beams of the dimensions and forms turned out by Deutsch-Luxemburg, but not by the same process; and they demand that they have their appropriate allotments in these products.

### Exports of Blooms and Billets Cause Differences

Another serious point of difference among the mills is in respect to exported semi-manufactured steel. Hitherto the Union has been selling much steel abroad at considerably lower prices than at home; and on steel material sold in the home market for making products for export it has been granting a drawback. In making its settlements with the various companies, however, its profits are divided equally, without any account being taken of whether a mill turns out any semi-manufactured material or not. Now, there are some companies in the eastern and southern parts of the country which produce none, and they naturally object to having their earnings on rails and structural shapes docked for the benefit of mills running on such material. Those eastern and southern concerns want to have separate organizations formed in the Union, one for each class of A products, in order to rid themselves of what they feel to be an unjust distribution of profits; but, on the other hand, if such a readjustment should be carried out, then the mills now running exclusively or largely on steel material would, on their part, demand new or increased allotments in rails and structural shapes; and so another hitch in the negotiations would arise.

### The Enormous Allotment Claims in B Products

Besides those three points of controversy in A products there remains the difficulty of the enormous allotment claims in B products. The total increase in allotments demanded is now given at 6,000,000 tons, against present allotments of about 12,000,000 tons for all classes of steel. Moreover, the difficulty is enhanced by reason of the fact that the B claims are very unequally distributed, some few establishments demanding the lion's share, while others ask for but modest increases. Under these circumstances the question is beginning to be heard in various quarters, "Of what use is the Union to us?" And such discontented mills find that the only good service that it does for them is in the international arrangements that it has made about steel rails and structural shapes. They admit also that the Union has organized valuable machinery abroad for selling German steel; and that it effects savings on freight charges in the home market by having products made at the points nearest to the consumer; but they do not see that the Union gives them any further advantages.

So far as semi-manufactured steel is concerned, argue these discontents, the syndication of it is growing less and less important in proportion as the large steel producers annex bar, plate, rod, and tube mills and thus become consumers of their own product. They also point out that the home market in rails could very well dispense with the Union, since the various railroad ministers would follow the policy of distributing orders equally among the mills. And so far as the home market for structural shapes is concerned, they say that the price policy of the Union has worked to the disadvantage of the mills, since it has kept prices so high as to encourage the substitution of reinforced concrete for steel framing in building operations. In any case—such is the conclusion of the discontented element—new organizations could be formed for steel rails and for structural shapes, such as existed before the Union was organized.

When the Union was originally established, eight years ago, it was intended to extend the full syndicate arrangement to Class B, but this has never been done, and it is not regarded as possible now; and the mere granting of allotments in these goods, without fixing prices and taking over the sale of the products, is looked upon by many of the mills as a very questionable service. On the contrary, the manufacturers of bars and plates, who are now far exceeding their allotments and paying 23 marks per ton on all sold in excess of their allotments, feel that the Union is a direct injury to their business interests; for at present, in the settlement of accounts with it, the exact amount of sales made by each mill is made known to all the other concerns, and this only increases the rivalry among them. Owing, too, to the present prosperous state of the trade the fear that a sharp drop in prices would follow the dissolution of the Union has been greatly diminished, so far as B products are concerned. The manufacturers of bars could even accept a considerable reduction in price and fare better than now under their heavy payments to the Union for excess production. These payments are in fact growing very irksome to the bar mills, in particular; they say that it is absurd to inflict a penalty upon the enterprising concerns which exert themselves to get orders, mostly from abroad, in excess of their allotments.

The commercial spirit of the companies concerned begins to rebel against the bureaucratic and expensive system of the Union; and they want more freedom of movement in the sale of their output. Many of the companies have reached the conclusion that a period of free competition would not be a bad thing for the steel industry, since a sifting process would then set in which would show the actual capacity of the various establishments when thrown upon their own initiative, instead of passively depending upon their quotas in the Union. From all this it is evident that the sentiment for the prolongation of the organization is not very strong. Yet it is quite impossible to predict what will happen between now and April 30, after which the mills may commence taking orders upon their own account if the agreement to renew the Union has not meanwhile been signed.

## A Switching Complaint Dismissed

The Alan Wood Iron & Steel Company has been denied relief by the Interstate Commerce Commission on its complaint against the Pennsylvania and Reading railroads for discrimination in performing special switching work for competitors and refusing to do the same thing for that company. It was brought out in the hearing that interchange tracks were constructed under agreement between the steel company and the carriers, partly on land belonging to the defendants and partly on the property of the complainant, under a joint cost arrangement. The understanding was that the steel company should do its own switching to and from loading points to these interchange tracks.

The steel company averred that after several years of operation under this agreement it was discovered that the roads were doing all the switching for competing plants along the lines. The company, thereupon, sought to have the Interstate Commerce Commission direct the carriers to either do the same for it or make an allowance to the company for performing the service. The commission refused to act unless the complainant should first formally terminate the agreement under which the interchange tracks had been constructed and make a proper refund to the roads for the expense they had been put to.

## Welland's Advantages

A brochure entitled "Turn Wellandward" has been issued calling attention to the industrial advantages of Welland, Canada. The features of electrical power supply, railroad facilities, lake shipping and available sites for industrial establishments are touched upon and this is followed by a list of facts about the city. A list of the articles made in Welland are given and this is followed by information on the banking facilities, the branch factories of American companies which have been established there and the distance from this municipality to various shipping and industrial centers. The brochure is illustrated with numerous halftone engravings of the city and the various establishments located there and one of the special features is a map showing that 45,000,000 or three quarters of the population of Canada and one-half that of the United States are located within a radius of 500 miles. Copies of this brochure and further information can be secured from the Secretary of the Board of Trade or the Industrial Commissioner.

# A New All-Steel Box Car

## Details of a 50-Ton Car Developed by the Summers Steel Car Company

An order for 100 50-ton capacity all-steel box cars has been placed by the Bessemer & Lake Erie Railroad Company with the Summers Steel Car Company, Pittsburgh, Pa. The special features of this car are a balanced side bearing and a special king pin arrangement. Fig. 1 is a view of a sample car of the Summers Company which has been in service for about two years, and details of the car are given in Figs. 2 and 3, being views of the truck arrangement and the king pin construction respectively.

Fig. 1—A New Type of All-Steel Box Car Built by the Summers Steel Car Company, Pittsburgh, Pa.

The new cars will be constructed along the same general lines as the one illustrated in Fig. 1, although they will be 4 ft. longer. The truck side frames will of the standard arch bar type, but will be equipped with the builder's balanced side bearing, the same as the original car. The special advantage claimed for this balanced side bearing, which is a somewhat new and radical change in car construction, is that a rigidly constructed car body can traverse twisted and rough track without throwing the twist into the car body or without danger of derailment. It is pointed out that by reason of the rigidity of cars in connection with a rigid center bearing truck and rough track, new engine tenders and refrigerator, tank and other cars of similar construction are frequently derailed. This new truck, it is emphasized, possesses a flexibility that enables the car to travel over irregular track without distortion of the car body and the hammering blows, due to transverse rocking, are prevented.

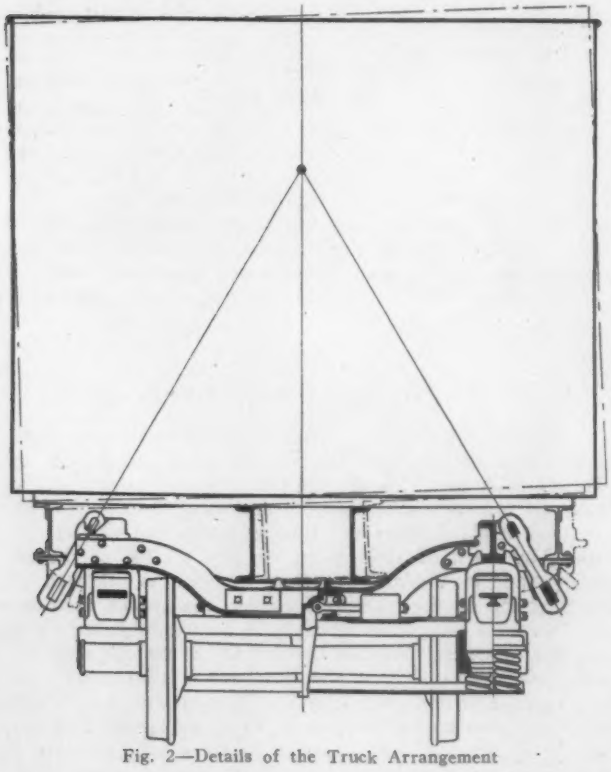


Fig. 2—Details of the Truck Arrangement

Plate girder construction is employed in these new cars, the floor plates being of ¼-in. material with 5/16-in. side sills. The end and side sheets are ¼ and 3/16 in. thick for one-half the hight of the car, the balance of these sheets and the roof being ⅛ in. thick. The entire roof construction will be made in Carnegie copper steel and the roof has the car lines on the outside, which give a smooth surface on the underside with no rivets driven through the roof plates to the inside of the car. The sides are stiffened by 3 x 5/16 in. Z bars and the floor beams are of 10-in. channel section extending the entire width of the car. The whole vertical load is carried on the side girders, and it is emphasized that with this form of construction the car weighs 43,000 lb., or approximately 3000 lb. less than a steel underframe car of the same capacity and with the same inside dimensions. The inside dimensions of the car are, length, 40 ft.; width, 9 ft., and hight, 8 ft. The car is about 9 in. less in hight at the eaves and the center of gravity is about 7 in. lower.

The truck arrangement of the car is shown in Fig. 2, where it is applied to an engine tender, the principle, however, being the same in both cases. The whole load is carried on the inclined hangers at the side of the car, which gives approximately the same effect as if it were suspended from a point at the intersection of the center line of the hangers, extended until they meet above the center of gravity of the car. It is emphasized that this arrangement permits the car body to swing sidewise at the bottom but prevents the side swaying at the top with the attendant vertical hammering blows on the side bearings, springs and wheels.

Fig. 3 is a longitudinal section through the truck transom and cradle and shows the arrangement of the various members of the car at this point. It will be noticed from this engraving that the center pin construction is of ample proportions and that the parts which come into play when moving the truck along are advantageously located. One of the special features of this truck which is not shown is the helical springs between the center pin and the truck

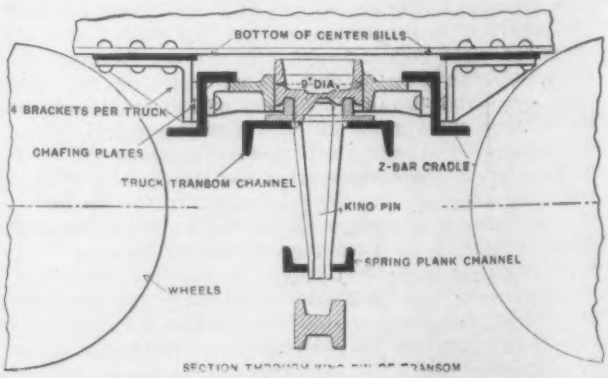



Fig. 3—The Arrangement of the King Pin

transom, which act to check and cushion the transverse swerve of the car body when rounding curves or riding on uneven track. When the car is traveling at high speed these springs also come into action and absorb the smaller and more frequent vibrations independently of the car body and the truck proper. Another special advantage claimed for this type of side bearing truck is that it is possible to distribute the load carried to all side bearings under any track conditions and thus equalize the load on all wheels.

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# The Efficiency Society

## Organization of Wide Scope with Over 700 Charter Members

An association "to promote efficiency or per cent. of result obtained relative to effort expended in every activity of man" was organized March 18 in the Engineering Societies Building, New York City. It represents the result of the movement to establish what was provisionally called the American Society for Promoting Efficiency, but which on finally convening was given the name, Efficiency Society. How important the society is to become may perhaps be judged from the remarkably large enrollment prior to meeting, numbering no less than 702 members, from the widely divergent fields from which the members have been drawn, as indicated in part by the names taken from the membership list, and from the character of papers of the first meeting and the personnel of the authors. A two days' meeting in all was held, Monday and Tuesday, and the attendance was good.

The Efficiency Society is a membership corporation composed of active members and associate members. To qualify for active membership one must have been in responsible charge of enterprises for at least five years or belong to one of the learned professions. Associate members are all others. A Board of Directors composed of 9 active members and 6 associate members is to manage the Society, electing officers from its own number. At this writing James G. Cannon, president Fourth National Bank, New York, has been named president for the period ending at the annual meeting in January, 1913. The annual dues are $15 for active members and $5 for associate members and the initiation fees, $25 and $10, respectively.

Among the papers read at the meeting, about 20 in all, were the following: "The General Principles of Organization Applied to an Individual Manufacturing Establishment," by Henry R. Towne, president Yale & Towne Mfg. Company. "The Organization of an Aggregation of Manufacturing Establishments," by C. W. Carpenter, ex-president Herring-Hall-Marvin Safe Company. "The Administrative Departments," by Melville W. Mix, president Dodge Mfg. Company. "The Production Department," by John Calder, manager Remington Typewriter Works. "The Record and Cost Department," by S. S. Wheeler, president Crocker-Wheeler Company. "Industrial Education," by M. W. Alexander, superintendent apprentices, General Electric Company.

Among those elected directors for the first year are: Bion J. Arnold, Chicago; W. C. Brown, president New York Central Lines; Prof. M. E. Cooley, University of Michigan; Prof. W. F. M. Goss, University of Illinois; M. W. Mix, Mishawaka, Ind.; Henry R. Towne, New York City; George Westinghouse, Pittsburgh, and S. S. Wheeler, Ampere, N. J. It is understood that an effort is to be made to get H. F. J. Porter, who was secretary of the organizing committee of 130, to accept the secretaryship.

The following list has been taken from that of the 700 or more charter members:

Charles E. Aaron, President, New York Leather Belting Company, New York City.
M. W. Alexander, General Electric Company, West Lynn, Mass.
H. C. Atkins, President, E. C. Atkins & Co., Indianapolis, Ind.
J. G. Battelle, President, Columbus Iron & Steel Company, Columbus, Ohio.
Quincy Bent, Assistant to President, Maryland Steel Company, Sparrows Point, Md.
T. J. Brady, President, Republic Iron & Steel Company, Youngstown, Ohio.
E. J. Buffington, President, Illinois Steel Company, Chicago, Ill.
James A. Burden, Jr., President, Burden Iron Company, Troy, N. Y.
Frank D. Carney, General Superintendent, The Pennsylvania Steel Company, Steelton, Pa.
W. R. Cole, President, Napier Iron Company, Nashville, Tenn.
Geo. G. Crawford, President, Tennessee Coal, Iron and Railroad Company, Birmingham, Ala.
H. G. Dalton, Pickands, Mather & Company, Cleveland, Ohio.
Fred H. Daniels, Chief Engineer, American Steel & Wire Company, Worcester, Mass.
Thomas Devlin, President, Thos. Devlin Mfg. Company, Philadelphia.
James M. Dodge, Link-Belt Company, Nicetown, Philadelphia, Pa.
J. B. Finley, President, Colonial Steel Company, Pittsburgh.
P. W. Gates, President, Hanna Engineering Works, Chicago, Ill.
H. L. Gantt, New York City.
Fred A. Geier, President, Cincinnati Milling Machine Company.
Frank B. Gilbreth, Contractor, 60 Broadway, New York City.
Nelson A. Gladding, Vice-President, E. C. Atkins Company, Indianapolis, Ind.
Norman J. Gould, President, Goulds Mfg. Company.
W. T. Graham, President, American Can Company.
R. C. Haskins, President, International Harvester Company.
James Hartness, President, Jones & Lamson Machine Company.
E. M. Herr, President, Westinghouse E. & M. Company, Pittsburgh.
Herbert T. Herr, Vice-President, Westinghouse Machine Company.
Aldus C. Higgins, President, Norton Company, Worcester, Mass.
John M. Jamison, President, Jamison Coal & Coke Company.
Chas. M. Jarvis, President, American Hardware Company.
R. H. Jeffrey, Vice-President and General Manager, The Jeffrey Mfg. Company, Columbus, Ohio.
John Kirby, Jr., President, National Association of Manufacturers.
Chas. Kirchhoff, President, American Institute Mining Engineers.
C. A. La Fever, President and Works Manager, M. Rumely Company, Battle Creek, Mich.
Wm. L. Laib, Secretary, Hanna Engineering Works, Chicago, Ill.
F. E. Lally, Manager, The Crane Company, New York City.
Wm. Lodge, Lodge & Shipley Machine Company, Cincinnati, Ohio.
James Lord, President, American Iron & Steel Mfg. Company.
G. C. Lott, General Manager, Struthers Wells Company.
W. M. McFarland, Vice-President, Babcock & Wilcox Company.
Wm. E. McHenry, Auditor, The Cambria Steel Company.
Dr. Jno. A. Mathews, Manager, Halcomb Steel Company, Syracuse, N. Y.
Constant Meese, President, Pacific Jupiter Steel Company, San Francisco, Cal.
C. L. Miller, Vice-President and General Superintendent, American Steel & Wire Company, Pittsburgh, Pa.
Melville W. Mix, President, Dodge Mfg. Company, Mishawaka, Ind.
Samuel L. Moyer, First Vice-President, Luckenheimer Company.
Willard Parker, Vice-President, Pennsylvania Shafting Company, Spring City, Pa.
J. Hervey Patton, President, Harrisburg Pipe & Pipe Bending Works, Harrisburg, Pa.
C. D. Pettis, Assistant to Vice-President, American Brake Shoe & Foundry Company, Chicago, Ill.
F. R. Pleasonton, Pennsylvania Steel Company, Steelton, Pa.
F. S. Reitzel, Comptroller, Pennsylvania Steel Company.
J. V. W. Reynders, Vice-President, Pennsylvania Steel Company, Steelton, Pa.
F. Salomon, President, Otto Gas Engine Works, Philadelphia, Pa.
Wm. B. Schiller, President, National Tube Company, Pittsburgh, Pa.
C. E. Search, Manager, Allis-Chalmers Company, Milwaukee, Wis.
John H. Sherman, Harrison Safety Boiler Works, Philadelphia, Pa.
Chas. H. Simmons, President, John Simmons Company, 104 Centre street, New York City.
Oberlin Smith, President, Ferracute Machine Company, Bridgeton, N. J.
J. T. Speer, President, Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, Pa.
W. W. Stephens, President, Stephens-Adamson Mfg. Company, Aurora, Ill.
C. G. Stevens, C. G. Stevens & Co., Chicago, Ill.
D. K. Swartwout, President, Ohio Blower Company, Cleveland, Ohio.
John A. Topping, Chairman, Republic Iron & Steel Company.
Henry R. Towne, President, Yale & Towne Mfg. Company.
J. A. Vail, General Manager, Fairbanks-Morse Mfg. Company.
David Van Alstyne, Vice-President, Allis-Chalmers Company.
Geo. M. Verity, President, American Rolling Mill Company.
G. S. Vickery, Superintendent, Frog & Switch Department, Pennsylvania Steel Company, Steelton, Pa.
C. Wood Walter, Vice-President, Cincinnati Milling Machine Company, Cincinnati, Ohio.
Frederick W. Wood, President, Maryland Steel Company.
Walter Wood, R. D. Wood & Co., 400 Chestnut street, Philadelphia, Pa.
Chas. H. Zehnder, Vice-President, Empire Steel & Iron Company.
Chas. L. Allen, General Manager, Norton Company, Worcester.
Stedman Bent, Purchasing Agent, Pennsylvania Steel Company.
Charles Bieler, President, American Foundry Company, Indianapolis, Ind.
Henry Chalfant, President, Sprang-Chalfant & Co., Pittsburgh, Pa.
Walter L. Clark, Vice-President, Niles, Bement, Pond Company.
Edward Bailey Cook, General Manager, Eastern Steel Company.
Robert Crawford, Superintendent, Atlas Foundry Company, Detroit.
David Fleming, President, Harrisburg Foundry & Machine Works.
F. F. Fuessenich, Hendey Machine Company, Torrington, Conn.
Walter S. Giele, Harrison Safety Boiler Works, Philadelphia, Pa.
Martin L. Grimes, Comptroller, Central Iron & Steel Company, Harrisburg, Pa.
H. C. Holthoff, Works Manager, Allis-Chalmers Company, Chicago
J. R. Kilbourne, Vice-President and General Manager, Kilbourne & Jacobs Mfg. Company, Columbus, Ohio.
Henry O. Lange, President, Ferguson & Lange Foundry Company, Chicago, Ill.
L. A. Larsen, Assistant to Vice-President, American Locomotive Company, New York City.
John H. Lidgerwood, President, Lidgerwood Mfg. Company.
Samuel W. Luitwieler, President, Luitwieler Pumping Engine Company, Rochester, N. Y.
Frank E. Maynard, Plant Manager, General Fire Extinguisher Company, Providence, R. I.
F. A. Parkhurst, Organizing Engineer, Ferracute Machine Company, Bridgeton, N. J.
Samuel H. Reck, Secretary, Rockford Drilling Machine Company.
Edward A. Rose, Secretary, Ross Gear & Tool Company, La Fayette.
Edward L. Ryerson, Jr., Jos. T. Ryerson & Son Company, Chicago.
Lloyd A. Sagendorph, President, American Metal Stamping Company, Germantown, Philadelphia, Pa.
Frank A. Scott, Secretary and Treasurer, Warner & Swasey Company, Cleveland, Ohio.
F. A. Shick, Comptroller, Bethlehem Steel Company.
G. W. Spahr, Cost Accountant, The Pennsylvania Steel Company.
George F. Steedman, Curtis & Company, St. Louis, Mo.
J. Edward Swanker, David Lupton & Sons, Philadelphia, Pa.
J. F. Welborn, President, The Colorado Fuel & Iron Company.
Harold B. Atkins, Goldschmidt-Thermit Company, New York City.
Wm. H. Coldwell, President and General Manager, Coldwell Lawn Mower Company, Newburgh, N. Y.

# The Taylor System in Government Shops

## The Report of the House Committee to Investigate Various Systems of Shop Management Is in General Adverse

The report of the special committee of the House of Representatives to investigate the Taylor and other systems of shop management was presented to the House at Washington, March 9. The committee consists of W. B. Wilson, chairman, William C. Redfield and John Q. Tilson. Mr. Redfield, the second member, bases his views on many years of experience as a manufacturer. He was long connected with J. H. Williams & Co., Brooklyn, N. Y., manufacturers of drop forgings, and in the last two or three years of this connection was president of the company. He is now vice-president of the American Blower Company, Detroit. We print the report of the committee in full, in view of the importance of its inquiry and of the space we have given to the committee's hearings and to the results secured at Watertown Arsenal from the introduction of the premium system in the foundry department.

Your committee, appointed under House resolution 90, adopted August 21, 1911, respectfully submits the following report:

By the provisions of the resolution under which it was appointed your committee was directed

> to investigate the Taylor and other systems of shop management, which investigation shall include its applicability to Government works, its effect on the health and pay of employees, its effect on wages and labor cost, and such other matters connected therewith as may give a thorough understanding of the results of the installation of this system.

We have examined a number of witnesses relative to the various systems of shop management which have been worked out and are being introduced in a limited number of establishments throughout the country, but we have given especial attention to an investigation of the Taylor system, because we found that this system is being introduced in part in two Government arsenals and its extension into other Government plants is being seriously considered by the officers in charge of the Ordnance Bureau of the War Department. All of these systems, including the Taylor system, have become known by the general term "scientific management" and are referred to as such throughout the hearings, a copy of which accompanies this report.

### Changes in Shop Management Should Be Gradual

A great amount of good work has been done by Mr. Taylor and others in working out the details of scientific methods of shop management, but neither Mr. Taylor nor anyone else has presented to this committee a system so complete and perfect as to justify a recommendation that it be imposed in its entirety in any Government shop. Any radical change in factory management should be a gradual evolution out of that which has preceded. The present systems, or lack of systems, with their good and their bad points, are themselves the result of long evolution. No drastic or radical change in them should be suddenly or even quickly imposed by fiat from above. Men have become accustomed alike to the good and the bad that are in the systems under which they work. They know and approve the good; they know how to combat the evil. They are naturally and properly suspicious that motives purely selfish may be behind the sudden change. Confidence is a plant of slow growth. Neither the Taylor system nor any other should be imposed from above on an unwilling working force. Any system of shop management ought to be the result of mutual conference and mutual consent, and that takes time. Government in a mill should be like government in a state—"with the consent of the governed."

### Efficiency Must Not Be "at the Cost of the Men"

It appears to your committee that no one can seriously object, and as a matter of fact no one has objected, to any system which so standardizes and systematizes the work to be performed that a greater amount of production is secured with the same expenditure of labor. Employer and employee alike and the public generally are interested in securing the largest amount and the best quality of production that can possibly be secured by the amount of labor expended. All men have a mutual interest in the accomplishment of that end. It is only when it comes to a division of that which has been produced that their interests diverge. It, therefore, follows that any system of management, which has a tendency to destroy the power of employees, individually or collectively, to secure the equivalent of the production which properly belongs to them must be looked upon as being dangerous to the welfare of the community at large.

Efficiency must not be had at the cost of the men, women and children who labor and who should be the primary beneficiaries from efficiency. We should study how to produce the best results in output while also producing conditions to make the most efficient men and women to produce that output, and this must be done by conserving in every way not only their health and physical and nervous vigor, but by creating such conditions as will permit them to work out their own happiness and contentment, secure wages which will enable them to live in such a manner as to maintain their own self-respect and sufficient leisure to enjoy the refreshing influence of mental and moral recreation.

### Three Divisions of the Taylor System

The Taylor system of shop management may be divided into three general heads: Standardization, systematization, and stimulation. Efficiency may be gained in whole or in part by any of these ways, by any two of them, or by all three combined. Any or all of these devices may be carried to an extreme. In the first two devices, namely, standardization and systematization, the expense which would be created by carrying them to an extreme would act as a check against the continuance of such a condition, but that check would not exist in that portion of stimulation which is applied to the workman.

The expenses of standardization and systematization are borne by the management, while the expense of stimulation in the form of increased energy is borne by the workman. Any system of shop management which creates a burden charge through standardization or systematization which is too heavy for the shop to bear or which imposes burden charges through stimulation which are too heavy for the workman to bear should be discontinued.

That there is some loafing or soldiering amongst workmen has been shown by the testimony before your committee, but it is not general nor does it occur in numerous instances compared with the total number employed. Ordinary intelligent management under any system could eliminate it entirely, or at least reduce it to the point where it would not be a serious hindrance to production. Because there are some loafers is no reason why the remainder of the workmen should either be compelled or induced to work up to the very edge of the breaking strain. There is need for production at the lowest cost, but no economic necessity can justify requiring workmen to speed up to the highest point which they can continue from day to day and from year to year, even without injury to their health and strength. To place workmen in a position of that kind is to put them in the position of a beast of burden which is required to go on from day to day performing a given task.

### A Middle Ground Favored

There is a margin between the work performed by the loafer and the maximum task for a man, and in that margin lies a proper day's work. What constitutes a reasonable day's work can only be determined by practical experience and intelligent observation. It can not be wholly determined by a stop watch or any other time-measuring instrument used only for a brief period of time. By the stop watch you may be able to determine the time in which a piece of work can be done, but you do not thereby alone determine the length of time in which it ought to be done. The time study of the operations of any machine can be made with a reasonable degree of accuracy, because all of the elements can be taken into consideration in making the computation. A machine is an inanimate thing—it has no life, no brain, no sentiment, and no place in the social order. With a workman it is different. He is a living, moving, sentient, social being; he is entitled to all the rights, privileges, opportunities, and respectful consideration given to other men. He would be less than a man if he did not resent the introduction of any system which deals with him in the same way as a beast of burden or an inanimate machine.

In making a time study of the operations of a workman, all of the elements can not be taken into consideration, and consequently the computation can not be made with mathematical accuracy. There is no work that can be performed, or that is performed, that is not preceded by a mental process on the part of the workman. The more skill needed in the work, the greater the mental process which precedes the expression of it. So far as your committee has been able to learn, there is no method known to scientific management by which a time study can be made of the mental process preceding the physical act.

The elements of the mental process not being susceptible of determination by a stop-watch time study, the study of itself must consequently be inaccurate and the workmen are justified in objecting to such a time study being used as a basis upon which to compute their day's work and compensation when in their judgment injustice is done them thereby.

### Methods of Stimulating Workmen

In an effort to stimulate the workmen to increased activity various methods are used under different systems—such as discharge, fear of discharge, stop-watch time studies, and bonuses. The fear of discharge exists under any system and, no doubt, will continue to exist and to act as stimulus. The establishment of a premium or bonus presupposes the establishment of a task. The bonus system is based upon the establishment of a task large enough for an ordinary day's work and then giving additional compensation as an inducement to a workman to do more than he would ordinarily do.

The proponents of the Taylor system assert that the workman will be protected against any injustice either in the amount of work required of him or the compensation for that work by a change in the mental attitude brought about by the introduction of the system. A mental attitude which produces a spirit of co-operation between the employer and the employee is much to be desired, but such a spirit is not the result of any particular system of management, but is due almost entirely to the personality of the management and employee and the spirit that prevails in their relations to each other. Your committee is of the opinion that the mere mental attitude of the employer is too variable and unsubstantial a basis upon which to rest the material welfare of the wage worker. Standardizing and systematizing of work can be introduced successfully without any change in mental attitude from that which exists in the ordinary shop, but when it comes to introducing stimulation, a change of mental attitude by which the workman is willing to give a greater amount of energy for the same amount of pay may be very desirable to the employer of labor, but it is not always so desirable to the employee.

### Standardization

The Taylor system undertakes to standardize the tools, machines, nuts, bolts, etc., so as to eliminate as far as possible the loss of time and waste energy resulting from the lack of standardization. This is "a consummation devoutly to be wished." It was shown to your committee that in the Watertown Arsenal prior to the change in system there were several kinds of gear cutters run by one man. They were of different makes, capacities and ages, and operated on different principles. It was also shown that the nuts and bolts used were not standardized and consequently much time was lost by the workman in searching for sizes for his machine. This is not good practice. The machinery should be standardized, made alike in principle, if not in size, so that the time of the workman need not be wasted over different kinds of tools in an effort to find the right one. It is an advantage to have standard hand tools in our shops, so far as possible, that the question of selecting from among many need not come up.

Similar operations on similar work can be advantageously done in a similar way. It is a great waste of effort and thought to perform one operation in one way to-day and in another way to-morrow. It is a still greater waste to perform one operation in three or four different ways at the same time. Where there is no standard a man never gets a chance to produce the best results, and even when he works hard he makes a comparatively poor showing. But standardizing can be carried too far. When standardization has reached the point that the cost of maintaining it is greater than the saving resulting therefrom it should be discontinued.

### Systematization

Any system that eliminates unnecessary and wasted effort is good. It does not necessarily follow, however, that because any particular system has been branded as scientific that the brand alone makes it such. Conditions vary in different shops and a system which would be effective in one might not be as effective in another. The work and responsibility of selecting, evolving, or introducing a system suitable to a particular shop must in a great measure depend upon the intelligence of the management.

The Taylor system undertakes to systematize the work, first, by the establishment of a planning department; second, by detail study of the shop and the elements of a particular piece of work; third, by a routing system; and out of these grow a multitude of other details such as job cards, routing cards, time study, and many others. So much of this kind of detail work is needed under this system that it appears to your committee that constant care would have to be exercised in order to prevent the overhead charges thus created from using up all of the benefits which might be derived from the proper systematization of the work.

Every well-regulated industrial establishment should have a planning department proportioned to the size and need of the shop. In establishing a planning department practical common sense should be used the same as in everything else. In a small shop the manager might easily be his own planning department. In large establishments a separate department could be utilized to advantage for the proper planning of the work. In other words, every shop should be provided with the means of properly planning the handling of all work that comes to it so as to get it through the shop with the least possible waste of energy or loss of time to either men or machines.

### Study of Details of Work

A detailed study of the elements of every piece of work for the purpose of discovering the best system of handling it and the elimination of unnecessary work on the part of the workman may be and no doubt is under some circumstances productive of good results. That is particularly true when unskilled men are selected to do skilled work and it becomes necessary to study their movements in order to train them to that standard of efficiency which skilled men have already attained; but it is neither as essential nor as beneficial where men are employed who are trained and skilled in the particular line of work they are expected to do. The elimination of unnecessary motion in doing any work is always a benefit, because it conserves the vitality of the workman and makes his labor more productive.

It should be the duty of every foreman to observe the methods of his workmen with a view of correcting any improper methods and removing unnecessary motion in his work. It can not, however, be expected that every workman who has spent the greater part of his life in doing

work by methods which have become familiar to him would in all instances become more efficient by the adoption of some other method even though the other method eliminated unnecessary motion. In the judgment of your committee, the determination of whether or not a detailed study of the methods of the workmen should be made would, in a great measure, depend upon the skill or lack of skill of those required to do the work.

It is always an advantage to have the work properly routed through the shop, although it is not at all times necessary that a routing card should be made out to accompany the work. In small shops the routing might be done very effectively by the oral direction of the foreman. In larger establishments routing cards are beneficial for the effective handling of the work and they are made more effective when the machines are properly arranged and grouped so that the work can pass through with as little handling as possible, but even in large shops where the same work is being duplicated day after day it would be a waste of time and an unnecessary expenditure of energy to furnish a routing card for any job after the work had reached the point where it automatically routes itself.

#### Stimulation and Co-operation

Here is the crux of the difficulty in the introduction of the Taylor or any other system of so-called scientific management. So far as the workmen are concerned, they have not made any serious objections before your committee to standardizing or systematizing of the work, but they have vigorously protested against stimulation on the grounds that it tends to injure their health through overwork, and that while their wages may be temporarily increased, the result is that they are ultimately required to expend the greater amount of energy without receiving any additional pay. In the judgment of your committee the best and most effective stimulus that can be given to the work in a shop is to secure and hold a fine spirit of co-operation with the management on the part of the workmen. That can not be secured through timing the operations of the workman with a stop-watch when he considers such a procedure an indignity which recognizes him as being in the same class as a beast of burden or a machine, or when he considers such a time study inaccurate, and therefore unjust to him, or when he knows that it is to be used as a basis from which to compute the speed at which he must work and the wages he is to receive, when in his judgment the work, speed and wage rate are being established in order to secure greater profits for the employer at the expense of the workmen. A straight piecework basis may be used as a stimulus to workmen without injury to them, on work that is continuously duplicated for a prolonged period of time, provided the workmen are so situated that they can protect themselves against the entire power of the management being centered upon them individually to compel them to work beyond their normal capacity, and provided, further, that they can secure a satisfactory guaranty that when the piece rate has been once established it will not be reduced unless the methods of production are materially changed, and reduced then only in proportion to the reduction in mental and physical energy required in the production of the article.

In any form that stimulation may be used, except that of true co-operation, continuous care must be had that quality is not sacrificed to quantity.

Neither the Taylor system, the Emerson system, the Gantt system, the Brombacher system, the Stimpson system, nor any of the systems of so-called scientific management have been in existence long enough for your committee to determine with accuracy their effect on the health and pay of employees and their effect on wages and labor cost. The conclusions we have arrived at are all based upon what we consider to be the logical sequence of the conditions existing or proposed. The selection of any system of shop management for the various Government works must be to a great extent a matter of administration, and your committee does not deem it advisable nor expedient to make any recommendations for legislation upon the subject at this time.

#### Conclusions and Recommendations

We recommend: 1. Wherever possible, in Government work the machines, tools, nuts and bolts should be standardized, the management using continuous care that the cost of standardization shall not exceed the benefits to be derived from the same.

2. That the management should at all times give studious attention to the proper systematizing and routing of work, the grouping of machines, the furnishing of proper tools and equipment, and the elimination of waste motion and waste energy on the part of the workmen.

3. That careful study should be made of machines in order to attain the speed and feed which will secure the highest and best possible production.

4. The management should put forth every effort to invite and induce full co-operation between the working force and themselves, and should, therefore, deal with the working force in the most open, frank and candid way, affording the fullest opportunity for consultation and explanation in advance of proposed action affecting the interests of the workmen. Stop-watch time study should not be made of workmen without their consent or any conditions be imposed upon them by authority which imply any indignity. Piecework may be introduced where the work to be performed is a continuous duplication, but with the express understanding that piecework rates shall not be cut unless the conditions of production are materially changed. In other cases the rate should be a straight day-wage rate at the highest prevailing rate for a similar class of work in the neighborhood where the Government work is to be performed, except that by mutual consent bonus and premium work may be introduced, but only with scrupulous care that the workman shall have full opportunity for increasing his earnings without risk of overstrain, for collective bargaining if he should so desire, and for easy and direct appeal to the management in any cases where he may think his interests threatened.

## West African Tin Mines

The London Economist, in discussing British speculation in Nigerian tin companies' shares, gives some interesting information regarding the development of tin production in the British colony of Nigeria in west Africa. The names of half a dozen companies are mentioned in whose shares active speculation is being conducted in London. The statement is made that in January of this year one company produced 50 tons; another, 35 tons; a third, 30 tons; a fourth, 29 tons, etc. One company is stated to have turned out 531 tons last year, which is the largest production of any single Nigerian interest. The next best producer turned out 278 tons. These figures are sufficient to show that the new tin mining region is of considerable importance. The Economist states that all sorts of wild schemes are being propounded for the exploiting of the public interest aroused in these mines. Shares of new companies are being introduced almost daily on the London Stock Exchange.

A branch railroad to the tin fields is to be opened for traffic in April. It will run from Zaria on the Kano line, the distance to the tin fields from that point being about 100 miles. The first mention of this tin district in *The Iron Age* was in the issue of April 21, 1910, page 970.

**Solving Lubrication Problems**—With a view to caring for the increased demand for the special investigation of problems pertaining to scientific lubrication the Richardson-Phenix Company, Milwaukee, Wis., has organized a special department. This will be in charge of C. Lee Straub, who will have his headquarters at the company's New York office in the Hudson Terminal Building, 50 Church street. All problems concerning the scientific and economical lubrication of power plant and transmission machinery, machine tools, etc., and any installation requiring unusual equipment or the design of special lubrication apparatus will receive his personal attention.

The Van Dorn & Dutton Company, Cleveland, Ohio, has recently opened two new sales offices for its portable tool department. One is at 643 Endicott Building, St. Paul, Minn., in charge of O. Johnsen, district sales manager, and the other is at 325 Security Building, Los Angeles, Cal., in charge of J. L. Davidson, district sales manager.

# New Cam Feed Drilling Machine

## A Recently Developed Tool of the Dwight Slate Machine Company

Increased production and a large saving in drilling costs are claimed for a new type of automatic cam feed drilling machine built by the Dwight Slate Machine Company, Hartford, Conn. The first of these advantages is secured by having the spindles fed in progression, automatically and continuously, and the second is the result of laying out the cam shape so as to duplicate approximately the performance of an expert hand driller with much cheaper labor. The throw of the feed arm limits the length of the feed, so that the machine is intended for drilling holes not exceeding 1½ in. in depth and for pieces of moderate size which can be rapidly handled in jigs, the special field covered being parts for locks, light hardware, small mechanics' tools and work of a similar nature. Fig. 1 is a view of a four-spindle machine equipped with this new type of feed, while Fig. 2 gives details of the feed mechanism.

Referring to Fig. 2, the amount of the feed is controlled by the cam *a*, which is set to operate the spindles successively at the proportion of the revolution of the shaft corresponding to the number of spindles, in this case the spindles feeding at each quarter revolution. The rotation of the cam *a* causes the arm connected with the nut *b* to move back and forth and feed the spindle down any predetermined number of notches by the segment gear which meshes with the rack cut in the spindle sleeve. If desired the feed can be tripped by hand and the spindle is returned to its highest position by a weight on the inside of the column. The length of the feed is varied without the necessity of employing different cams by simply adjusting the position of the nut *b* in the slot *c*. A safety device or automatic feed release is connected with each spindle and operates directly upon it to stop the feed in case of overload at the drill point. In this way any breakage that might occur in the feed mechanism is prevented as well as a large proportion of the breakage of twist drills. This safety device consists of a plunger, *d*, which rests in the notch *e* and is held in position by the spring *f*. If the load at the drill point becomes too heavy to be handled the plunger simply slips out of the notch and so acts as a safety device.

The machine is driven by a belt from an overhead countershaft which passes around the three-step cone pulley shown at the right of Fig. 1. Each spindle has an individual drive from this shaft by a separate pulley and endless belt. The tension of these belts is varied by loosening the binder handle shown directly above the driving cone pulley, and the tension of the individual belts for each spindle is varied by adjusting the screw mounted underneath them. Three spindle speeds and three rates of feed for each speed are available, the latter being controlled by a change gear box which is conveniently located on the far end of the machine. The spindles have a means of adjustment whereby the drill points can be leveled regardless of the length of drill being employed. The screw and hand wheel shown underneath the table regulate its elevation. The bearings are of the oil-well type, and exceptional results are said to have been secured from their use.

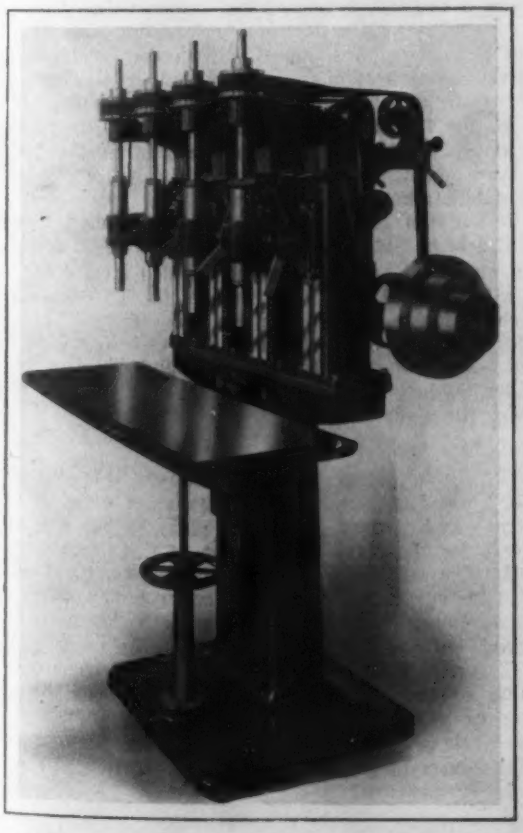

Fig. 1—A New Four-Spindle Drilling Machine with Automatic Cam Feed Built by the Dwight Slate Machine Company, Hartford, Conn.

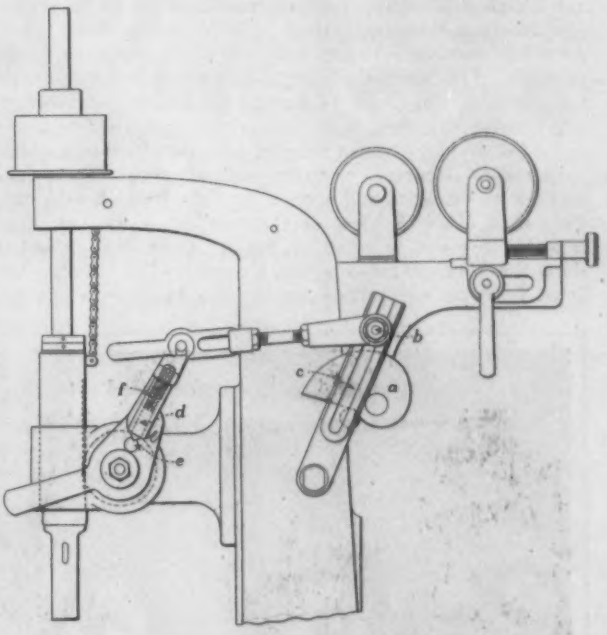


Fig. 2—Detail of the Feed Mechanism

These drilling machines are built with two, three, four, five, six and eight spindles with a common overhang of 7½ in. and a maximum feed of 1½ in. In all except the two largest machines the distance between the spindle centers is 9 3/16 in. and in these it is 7 5/16 in. The total traverse of the spindle sleeve in all sizes is 3⅛ in. and the maximum and minimum distances between the table and the spindle are 20 and 7½ in. respectively. The diameter of the spindles which have a No. 2 Morse taper hole in them is 15/16 in. in their bearings. The size of the table and the floor space required by the various sizes ranges from 16 x 27½ and 36 x 30 in. to 16¾ x 62½ and 36 x 72 in. respectively, the over-all hight being the same for all, 72 in. The spindle driving belt and the main driving belt are 1½ and 2¼ in. wide respectively for all sizes and the countershaft runs at the rate of 450 r.p.m. The approximate net weights range from 800 lb. for the two-spindle machine to 2050 lb. for the largest size. In addition to the cam feed this drill can also be supplied with a geared worm feed if so desired. These machines have the same general dimensions as the cam feed type, except that the maximum feed to the spindles is 5¾ in.

As regularly equipped the cam feed machines are designed to drill only one hole per piece. If so desired, however, the four, six and eight-spindle types can be furnished with an extra shaft having two sets of cams so as to drill two holes per piece.

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The Osborn Engineering Company, after April 1, will have its main offices at 740 Engineers Building, Cleveland, Ohio.

# Gas Burning Steel Furnaces

## A Recent Installation at the Braeburn Steel Company

Recently the Braeburn Steel Company, Braeburn, Pa., has installed a number of gas burning steel furnaces for heat treating manganese steel. The company already had some gas burning furnaces installed for doing other kinds of work. The last installation consisted of two heat treating furnaces which are 18 and 24 ft. long respectively in the heating chamber, both having the same width, 2 ft., and a heavily constructed forging furnace which is a somewhat radical departure from the ordinary type. These furnaces were designed and erected by Tate-Jones & Co., Inc., Pittsburgh, Pa. A view of the smaller of the two heat treating furnaces is given in Fig. 1, while Figs. 2 and 3 show the forging furnace and a semi-muffle furnace for large die work which the company has had for some time.

Fig. 1—An 18 x 2 Ft. Heat Treating Gas Burning Furnace Built by Tate-Jones & Co., Inc., Pittsburgh, Pa.

The manganese steel produced by this company is a special product which is said to possess excellent wearing qualities. It is rolled into bars or plates at the mill and is then heat treated before being worked further. This treatment requires a very even heat and it is pointed out that a variation in temperature of 10 deg. C. will cause the material to break down under the tests applied. For giving this heat treatment two furnaces have been installed having heating chambers 18 and 24 ft. long respectively, the width being the same in both cases, 2 ft. A view of the smaller of these furnaces is given in Fig. 1. The heating chambers in these furnaces represent the latest development in this field. The hot gases enter them through ports on one side along the floor and after circling the arch leave through corresponding ports on the opposite side. The arrangement of these ports is such that they cannot be obstructed by the bar stock which is being heated and can be easily adjusted to equalize the temperature. The combustion of the gas fuel takes place in a chamber under the furnace hearth and the gases after passing through the heating chamber as described enter a flue extending the full length of the furnace. From there they are discharged into the air after a maximum amount of heat has been extracted. It is pointed out that with this type of furnace it is not necessary to employ an expensive stack and the amount of heat wasted is reduced to a minimum. Pyrometers installed in connection with these furnaces, it is stated, have failed to record the variation of a single degree throughout the entire length of either unit. When the heat treating process is completed the material passes directly to the shears, punches, heading machines, etc.

Fig. 2—View of the Forging Furnace Showing the Discharge Opening

For heating the steel billets preparatory to forging, a heavily constructed furnace illustrated in Fig. 2 has been installed. This furnace is said to be a radical departure from the ordinary type of forging furnace, since there is no flame in the heating chamber. It is emphasized that huge tongues of flame shooting out of the mouths and through the ports in the top of the furnace have been done away with in this type. The arch is solid and as there is no flame in the heating chamber the formation of slag which destroys the fire brick is thus prevented. Like the new heat treating furnaces no stack is required in connection with the forging furnace and the waste heat in the gases is utilized in heating the floor from underneath. The billets are charged at the end of the furnace and are pushed through the discharging door, which is shown on the side of the furnace. This arrangement, it is emphasized, insures a steady supply of billets heated to 1500 deg. C.

In addition to the three recently installed furnaces, the Braeburn Steel Company also has a semi-muffle furnace, shown in Fig. 3 (page 731), which is used for large die work, etc. A hardening furnace for high speed steels which is capable of maintaining a temperature of 1300 deg. C. for 18 hr. per day also forms a part of the plant's equipment. Both these furnaces are standard sizes of the builder, and the hardening furnace has been in steady service for a year without relining.

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The International Oxygen Company, 115 Broadway, New York, has completed an installation of an I. O. C. system oxy-hydrogen generating plant by the electrolytic process for the Navy Department, at the Brooklyn Navy Yard. The capacity of the plant is 3500 cu. ft. of oxygen and 7000 cu. ft. of hydrogen per 24 hours. The navy yard previously generated its oxygen by a chemical method, but found this inadequate for its needs. The I. O. C. system was adopted both for its efficiency and the quality of the gases produced, the purity of the gases being of great importance where the question of first-class work is concerned. In addition, the cost of producing the gases by this system is but a fraction of the cost by the former method.

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The Doehler Die-Casting Company, Court and Ninth streets, Brooklyn, N. Y., is about to erect an addition to its present plant. It will be of reinforced concrete, seven floors, 50 x 100 ft.

Fig. 3—The Semi-Muffle Furnace Employed for Large Die Work

## The Sloss-Sheffield Steel & Iron Company

### Year Ended November 30, 1911, Shows Deficit of $64,351

The Sloss-Sheffield Steel & Iron Company is one of the largest American producers of pig iron exclusively and all its operations are in the South. The results of its operations in 1911, as shown by its annual report, are therefore of special interest. After paying the regular dividend on the preferred stock a deficit was shown of $64,351. The income account for the year ended November 30, 1911, was as follows, compared with 1910:

| | 1911. | 1910. |
|---|---|---|
| *Profit on pig iron | $284,350 | $474,407 |
| Profit on coal | 79,469 | 113,189 |
| Profit on coke | 122,151 | 159,401 |
| Ore sales | 5,040 | ..... |
| Rent, royalties, etc. | 228,816 | 219,029 |
| Interest, dividends, etc. | 13,685 | 34,975 |
| Total income | $733,509 | $1,001,002 |
| Tax and license | 68,249 | 68,285 |
| Balance | $655,260 | $932,717 |
| General expenses | 30,648 | 51,193 |
| Net earnings | $634,612 | $881,522 |
| Interest | 229,964 | 210,000 |
| Surplus | $404,649 | $671,552 |
| Preferred dividend | 469,000 | 469,000 |
| Deficit | $64,351 | †$202,522 |
| Common dividend | ..... | 375,000 |
| Deficit | $64,351 | $172,477 |
| Previous surplus | 3,107,044 | 3,279,522 |
| Total surplus | $3,042,693 | $3,107,044 |

*After charges for depreciation on coal and iron ore, 25 cents per ton on iron for extraordinary repairs and renewals and 35 cents per ton profit on coke manufactured.

†Surplus.

The gross sales and earnings for 1911 were $4,521,360 in 1911, against $5,020,177 in 1910. The net working capital November 30, 1911, was $1,520,937, against $1,624,227 a year previous. The general balance sheet, as of November 30, compares as follows:

*Assets.*

| | 1911. | 1910. |
|---|---|---|
| Property account | $22,040,736 | $21,998,492 |
| Treasury securities | 244,293 | 244,243 |
| Stocks and bonds in other companies | 400,306 | 399,157 |
| Cash bills and accounts received | 772,305 | 933,149 |
| Supplies of raw material | 1,027,881 | 976,506 |
| Stocks in stores | 67,680 | 73,460 |
| Extraordinary renewal and replacement fund | 97,418 | 110,466 |
| Unexpired insurance and taxes | 6,203 | 6,342 |
| Total | $24,656,823 | $24,741,816 |

*Liabilities.*

| | | |
|---|---|---|
| Preferred stock | $6,700,000 | $6,700,000 |
| Common stock | 10,000,000 | 10,000,000 |
| Bonds | 4,000,000 | 4,000,000 |
| Current accounts | 865,366 | 837,948 |
| Payrolls | 48,764 | 76,823 |
| P. & L. surplus | 3,042,693 | 3,107,044 |
| Total | $24,656,823 | $24,741,816 |

#### President Maben Reviews Trade Conditions

In his remarks to the stockholders, President J. C. Maben says:

The heavy increase in the productive capacity of the country, together with the hostile attitude of legislative bodies and the lower courts toward corporations which unsettled business and caused a sharp curtailment of consumption, produced natural results, and the decline in the output of iron, as well as price, which began in the last half of 1910, continued throughout 1911. The selling price showed a net decline since the beginning of 1910 of $4.50 per ton; and in the meantime stocks of iron on the furnace yards increased considerably, this company alone showing a 70,000-ton increase.

This depression in the iron trade, following the misfortune which overtook the company in the flooding of its principal ore mines, as stated in the last annual report, caused the result of business during the year to be very unsatisfactory. The large amount of iron piled on the furnace yards, which had been produced at a cost far in excess of the cost of the past six months, owing to our having been forced to use inferior ore, most of which was bought from other companies at full prices, prevented our meeting the iron market as we would have done had the cost of our accumulated iron been anywhere near normal.

A marked reduction in the cost of iron was made by the company in 1911 compared with the previous year, as predicted in the last annual report, but the delivered price showed a greater decline in the year, than the decrease in the cost of production. Had we obtained the same average price for iron in the past year as in the previous year, as low as that average was, we should have shown the dividend earned on the common stock of the company.

#### He Raps Tariff Tinkering

The fiscal year closed with the market at about the lowest price, but since then there has been some improvement in both demand and price, and if the tinkering with the tariff does not again upset the business of the country it would seem that we may hope for a more prosperous year. The tonnage of iron on our furnace yards has been increased considerably during the year, and we were unable to free the company from the floating debt—from which it had been entirely free for a number of years—which was contracted the previous year. Owing to these adverse conditions, after deducting the 7 per cent. on the preferred stock, all depreciations, etc., and charging to cost a considerable amount expended at the mines and furnaces, a deficit in earnings for the year is shown of $64,351.

During the fiscal year there was an average of 50 per cent. of the company's furnaces in blast, as against an average of 60 per cent. in 1910, yet there was a decrease of only about 10,000 tons in the make of iron.

The market for coal in this district was dull for a large part of the year, owing to so many furnaces being out of blast, and the smaller consumption of coal by the railroads, which caused the closing down of a number of mines. The company's output of coal shows a decrease of 200,000 and of coke of 53,000 tons, while the average price obtained for the coal sold was less than in 1910. Had the profits from coal been the same as for 1910 a surplus over and above the preferred dividend would have been shown, notwithstanding the unsatisfactory condition of the iron market. Since the close of the fiscal year the demand for coal has improved, and the company has opened up two mines which have not been operated for a number of years.

The output of ore from the Sloss mines for the year showed a gain of 240,000 tons, and the present production is within 25,000 tons of the normal output before the flooding of the mines. This shortage should be more than recovered during the present year. The production of brown ore shows a falling off of 138,000 tons because of the closing down of Nos. 1 and 2 mines, we having no use for the ore.

# The American Boiler Manufacturers' Association

## Twenty-Fourth Annual Convention, New Orleans, La., March 12, 13 and 14, 1912

The twenty-fourth annual convention of the American Boiler Manufacturers' Association, held at New Orleans, on March 12, 13 and 14, was well up to the improved standard established in more recent years by the younger element. Under the presidency of Col. E. D. Meier, of New York City, the meetings have latterly taken on a more technical character, and those attending that just held listened to more than the usual number of addresses on technical subjects, all of which were given full attention and appreciation.

The first session, opening on Tuesday morning, March 12, was called to order by Secretary J. D. Farasey in the temporary absence of the president, whose train was delayed, but who arrived shortly thereafter. Mr. Farasey introduced the second vice-president, J. Don Smith, of Charleston, S. C., as the first vice-president's train was also delayed, a common occurrence in the South this season owing to the excessively heavy rains. Mr. Smith introduced Mayor Behrman, a ready and resourceful speaker, who extended a welcome of the warmest character. H. J. Hartley was called on to respond to the mayor, but he transferred this privilege to W. H. S. Bateman, who paid a high tribute to the character of New Orleans hospitality. Secretary Farasey called on John H. Murphy, of the Local Entertainment Committee, who hoped that the visitors would be well pleased with what would be provided for them, and desired James W. Porch, president of the New Orleans Progressive Union, to help him out on oratorical lines. Colonel Meier at this time arrived and explained his absence at the opening of the proceedings. Mr. Porch delivered a vigorous speech full of eloquent passages. The institution that he represented, the Progressive Union, is doing much for New Orleans.

In responding to these various addresses of welcome, Colonel Meier referred to the expected growth and development that would doubtless follow the opening of the Panama Canal. F. B. Slocum, of the Supply Men's Association, made announcement of the various entertainment functions of the week.

Secretary Farasey read a telegram from Past President Richard Hammond, of Buffalo, N. Y., urging the immediate and pressing importance of the movement for standard specifications for the construction of all types of steam boilers and other pressure vessels. President Meier stated that Mr. Hammond had not only served in the past on the Committee on Uniform Specifications, but that he had had the pleasure also of appointing him on a similar committee of the American Society of Mechanical Engineers of which Colonel Meier stated he was president last year, for the purpose of drawing up a set of specifications to be sanctioned by that society. Colonel Meier then recounted the history of the efforts of the American Boiler Manufacturers' Association toward uniformity of practice and specifications. He then introduced Capt. John A. Cotter, U. S. Supervising Inspector of Steam Vessels, New Orleans, who acknowledged the compliment paid him and expressed his pleasure to be in attendance.

### Opposed to Free Sugar

At the afternoon session the convention listened to an appeal from a representative of the American Cane Growers' Association for an expression against the bill now before Congress proposing to place sugar on the free list. He declared that the bill would hurt the boiler manufacturers as well as the sugar men, since in the State of Louisiana alone over 1,200,000 horsepower of boilers is used in the sugar industry. Resolutions were unanimously adopted condemning the proposed action. Following the adoption of the resolution, the following telegram was sent by President Meier to Louisiana Representatives in Congress advising them of the action taken:

**The twenty-fourth annual convention of the American Boiler Manufacturers' Association and of the Supplymen's Association, an adjunct of the first named, representing hundreds of millions of invested capital, to-day in joint meeting assembled unanimously adopted strong resolutions protesting in forceful language against the high-handed methods adopted by the Ways and Means Committee of Congress and which now threatens to be approved by the House with reference to the free entry of sugar into the United States, which will mean confiscation of from $300,000,000 to $500,000,000 of vested rights and which will utterly destroy the sugar industry of Louisiana and Texas as well as the beet sugar interests of the North and West. We submit that this is un-American, neither democratic nor republican, and directly opposed to our American institutions, and the bill should be defeated. We condemn such star chamber proceedings and demand that a public matter of the importance of this should be decided upon only after a full and free hearing has first been had.**

David J. Champion, Champion Rivet Company, Cleveland, Ohio, read a paper on "Rivets."

H. J. Hartley, William Cramp & Sons Ship & Engine Building Company, Philadelphia, read a paper on "Hydraulic Riveting." In connection with his paper Mr. Hartley exhibited a number of blue prints, which it was voted to include in the proceedings of the convention.

The remainder of the afternoon the Committee on Uniform Boiler Specifications was in session, as also on the morning and afternoon of the day following.

### Selection of Next Meeting Place and Election of Officers

The first order of business Wednesday morning was the report of the Committee on Time and Place of Convention for 1913. Charles J. Wangler, chairman, submitted the report, which was in favor of Cleveland, and further stating that in the opinion of the committee this was the most practicable point to insure a good attendance. The report was unanimously accepted and Cleveland was selected as the convention city for 1913, when the silver anniversary of the association will be celebrated.

George N. Riley, chairman of the Nominating Committee, presented the report of that committee, which was unanimously accepted and the nominees therein, consisting of the old officers, were duly re-elected. The list is as follows: President, E. D. Meier, New York City; secretary, J. D. Farasey, Cleveland, Ohio; treasurer, Joseph F. Wangler, St. Louis, Mo.; first vice-president, T. M. Rees, Pittsburgh, Pa.; second vice-president, J. Don Smith, Charleston, S. C.; third vice-president, W. A. Brunner, Phillipsburg, N. J.; fourth vice-president, H. D. MacKinnon, Bay City, Mich.; fifth vice-president, M. H. Broderick, Muncie, Ind.

Secretary Farasey announced the death of Hugh Tudor, of Cincinnati, an esteemed member of the association, in November last, and Messrs. Champion, Connelly and Wangler were appointed a committee to draft suitable resolutions.

George Thomas, 3d, of the Parkesburg Iron Company, Parkesburg, Pa., announced that H. A. Beale, Jr., of his company, who had been requested to read a paper on charcoal iron boiler tubes, was unable to be present. In his absence Mr. Thomas presented a paper entitled "History of Charcoal Iron and the Manufacture of Charcoal Iron Boiler Tubes." Following the paper Mr. Thomas showed a series of interesting slides, being mill views illustrative of good practice, in the course of which he remarked that it takes today about three carloads of charcoal to make 50 tons of charcoal iron. In reply to a question as to what variation in gauge would reject a tube on inspection at the mill, Mr. Thomas stated that a variation of one point would do so, but that generally customers did not object to a tube being slightly heavy.

J. Jay Dunn, of the Shelby Seamless Tube Company, Ellwood City, Pa., read a paper on "Manufacture of Seamless Steel Boiler Tubes," also illustrated by lantern slides.

In introducing Charles L. Huston, vice-president of the Lukens Iron & Steel Company, Coatesville, Pa., who read a paper on "Segregation in Steel," President Meier remarked that the general subject of segregation is one of intense interest to mechanical engineers and metallurgists

as well as manufacturers, and that the paper was not only one that had required much time and labor in its careful preparation, but would in every way prove instructive to boiler manufacturers. The paper was illustrated by lantern slides and numerous diagrams, some of which Mr. Huston had, as he explained, used in a former paper, "Experiments on Segregation in Steel Ingots in Its Relation to Plate Specifications," read before the American Society for Testing Materials and appearing in Volume VI of the Proceedings of that organization.

### Discussion on Mr. Huston's Paper

S. F. Jeter, of the Hartford Steam Boiler Inspection & Insurance Company; J. W. Kelly, of the National Tube Company; H. J. Hartley, of the Cramp Ship Building Company, and Colonel Meier took part in the discussion which followed.

Mr. Huston commented on the generally admitted fact of the difficulty of maintaining a close guarantee on the sulphur content, and therefore plate manufacturers desire a little margin over the guarantee. He thought that the sulphur did not affect the working of the steel after it gets out of the plate makers' hands to any serious extent so far as any tests made had come to his knowledge. Steel manufacturers were generally able to keep the phosphorus down, it very seldom getting above 0.02 in basic steel. In acid steel it is difficult to get it down below 0.03. Manufacturers, however, endeavor to meet requirements so far as lies in their power, but the speaker maintained that to require too close a margin in sulphur would result in the throwing out of material which the manufacturers think is available for service.

Mr. Jeter asked with regard to the analysis from ladle tests, and the speaker replied that it kept the manufacturers busy to get the content down to 0.03 sulphur in the ladle test, and 0.03 or 0.025 is all that can be gotten here. Of course, when at the center of the ingot it can be gotten closer. The manufacturer's endeavor is to aim at the best quality possible. To that end considerable shearing is sometimes necessary on the top and bottom to get down to sound plate.

### Questions in Plate Practice

In reply to a question as to whether the tensile strength and the elongation of steel plates would vary materially when taken transversely across the direction of rolling, as compared with the usual practice of taking them longitudinally with the direction of rolling, the speaker stated that if the test pieces are carefully prepared so as not to taper in the dressed out portions of the test pieces, there will be very little difference either in the tensile strength or the elongation, but the reduction of area depends upon the fracture and is considerably less in the transverse than in the longitudinal test pieces.

Mr. Huston further said that on examining a test piece it will be found that the elongation in the longitudinal test piece is obtained very largely from the extreme amount of stretch. If a testing machine is watched, it will be observed to let go after the metal has reached its maximum strength quite a while before it breaks. On the other hand, in the transverse specimens it will not let go until after it has reached the maximum, but will hold it up right until it breaks; showing that there is an after stretch after it has sustained its full load, which is not found in the other. There is a final stretch right where it goes off, which shows an additional element of safety in the longitudinal.

Mr. Huston stated that he had been informed that the German practice restricts the tensile strength to 56,000 lb. In this country, taking the standard limits of 55,000 to 65,000 lb. on most specifications, 55,000 lb. would be the strength that the safety factor of steam stresses would be figured upon, and he believed that is a safe limit, although his concern is making higher steels all the time when they are specified by the Government. His company had also made some steel very high in tensile strength not long ago for some of the Canadian provinces, yet he did not think it was wise to use such in the manufacture of boilers. Such steel will not curl off, but will crack or break off, which would not indicate that it is good for boiler use, yet it is being ordered and furnished on such orders all the time, and so specified in Government specifications.

Colonel Meier responded that the American Boiler Manufacturers' Association had entered its protest to the United States Government against that, in response to which the Government had reduced it to 65,000, and he did not believe that any steel was safe for boiler purposes at 75,000. Mr. Huston said that the steel that his company makes at 60,000 to 62,000, heavy plate, when it is rolled down to 15/16 in., is safer than 1¼-in. plate that has not been so rolled down.

### Some Flanging Conditions

James Kelly asked the speaker what was the cause of the spots which, in flanging boiler plate, develop at the flanging point, and whether anything can be done to remedy them.

Mr. Huston replied that he regretted he had not with him any suitable diagrams to illustrate the matter more fully, but if you were to cut ⅛ in. off of the surface in the mill you would find holes about ⅛ in. in diameter running from 1 in. to 1¼ in. into the depth of the metal, just like honeycomb. These are squeezed up more or less in the rolling, but if they are next to the edge of the plate they will open up. They may be right at the surface. To reduce these to the minimum it is necessary to closely watch the temperature and other conditions of the metal so as to get them driven in from the surface as far as possible, which is the best that can be done. They do less harm the further they are in. In shearing an especially thick plate, which has not received sufficient rolling, this condition is more pronounced. Mr. Kelly asked if shearing would remove this, and the speaker replied to the contrary, because they run clear across the surface of the plate to some extent, more so in the heavier plate.

Mr. Kelly suggested that probably sufficient shearing was not done before the plates were sent to the consumer, and Mr. Huston replied that if more shearing were done it would enhance the cost to the boiler manufacturer. With a view to remedying this condition, experiments had been made with titanium, vanadium and ferrosilicon. The latter runs it into the pipe. Manganese has been tried, but is liable to produce large blisters in the plate. Professor Howe has gone very thoroughly into this matter, and at his request a series of experiments was undertaken by the speaker's company. The specific gravity was determined of an ingot. It was then sliced nearly into the center line, reheated and rolled, and a piece cut from the corresponding portion of the outside edge of the ingot. This was polished and its structure was examined under the microscope, showing that this process had practically distributed the holes. The mill is now carefully watching the temperature of the pouring, and fluoride of calcium is thrown in at the critical moment as judged by the conditions of the temperature and slag and the degree of fluidity of the pour.

### Boiler Explosions

The Wednesday afternoon session opened with an address on "Boiler Explosions, Their Causes and Preventions," delivered by S. F. Jeter, who characterized steam boiler explosions as being attributable in the main to the boiler or some part of it being too weak to withstand the strain brought upon it. Internal corrosion, he said, is also often the cause of explosions. Mr. Jeter pointed out that there is a tendency on the part of some employees to cover up mistakes in the shop, and he advised that manufacturers should make every effort to find out these mistakes and correct them. A competent inspection service, he deposed, would constitute the greatest precaution, and a proper inquiry into all accidents by Government officials, qualified and clothed with ample authority to get at all the facts in each case and place the blame where it properly belongs, would tend to reduce the number of explosions materially.

In the discussion following, Colonel Meier remarked that municipal, state and insurance inspectors would protect the boiler manufacturer by more frequent and thorough inspection of the boilers after they leave the manufacturer's hands and are in service, inasmuch as the majority of the troubles referred to by Mr. Jeter may be traced to the improper care of boilers, something over which the manufacturer has absolutely no control. All future legislation ought to emphasize that feature. Mistakes are sometimes made in the repair of boilers, he re-

marked, and in illustration called upon John T. Corbett to present to the convention an illustration of a remarkable piece of repair work which elicited hearty laughter and applause.

H. C. Meinholtz of the Heine Safety Boiler Company, St. Louis, Mo., presented a paper on "Modern Boiler Shops, and How They Should be Equipped." In connection with his paper Mr. Meinholtz exhibited lantern slide views of the new plant which his company recently erected at St. Louis. While showing these slides, he incidentally mentioned the method adopted of stopping a leak in the accumulator by filling with Portland cement under hydrostatic pressure. This reference later brought forth an inquiry from Mr. Hartley as to what method had been adopted in the Heine plant for preventing freezing in the accumulator cylinder. Mr. Meinholtz explained that the hydraulic system was drained every day in extremely cold weather. Mr. Hartley remarked that in the case of a similar leak in his shop glycerine had been used and found very good and not expensive.

Thomas Aldcorn, Chicago Pneumatic Tool Company, New York City, read a paper on "The Use of Compressed Air in Boiler Shops," which dwelt more especially with installation rather than use.

### The Association's Work

W. H. S. Bateman of Philadelphia presented an exceptionally strong paper on the "American Boiler Manufacturers' Association, As It Is and As It Should Be," in which he praised the present national steamboat boiler inspection service and entered a strong plea for better specifications and inspection among the members of the association. He suggested the following five departments in the American Boiler Manufacturers' Association which he declared would solve the explosions and defect in workmanship complaints forever: First, the marine boiler section; second, water tube boiler section, return tubular boiler section; third, home heating, pressure tank, etc.; fourth, boiler section, and fifth, locomotive builders' boiler section. In offering this tentative plan, Mr. Bateman proposed these sections in each state under state committees who would be in active touch with the national association.

In commenting upon Mr. Bateman's paper, President Meier doubted whether it would be possible to introduce as many different sections or classifications of the work of the association as a practical measure of policy and do equal justice to all. Efforts had been made from the beginning to have state committees, but for some reason the effort had not up to the present time met with much success.

At the request of Mr. Bateman of the Supplymen's Association, F. B. Slocum, the efficient secretary of that organization, was given the floor, and briefly told the work done during the year in the direction of increasing membership in the American Boiler Manufacturers' Association and plans for the future. He had personally carried on a publicity campaign and had been in correspondence during the year with some 27 of the leading trade journals in the United States and Canada, all of whom had most kindly co-operated with the work of the committee on extension of membership. In January and February some 6000 letters had been sent out, and some of the results would probably not be apparent until the meeting at Cleveland next year.

### The Concluding Session's Business

Thursday morning's session opened with a paper by H. J. Hartley, entitled "Generalities Pertaining to the Boiler Manufacturing Business."

The Southern Boiler Works, Belleville, Ill., and A. T. Scannell, Chicago, Ill., were elected to active membership.

The following topical questions, reported by J. Don Smith, chairman of Committee on Topical Questions, were passed for consideration through the mail and also at the Cleveland convention:

1. Bagging of the bottom of a horizontal tubular boiler: (a) Have you had success in pushing the "bag" back to its proper place? (b) Is it physically and commercially the best method? (c) What is the best method of treatment? (d) Have you applied a patch by any welding process?

2. After a boiler shell or seam has ruptured (having been in use at least 15 years), will a sample of the material undergo or show as good a "test" as when it was new?

3. How much variation from a true circle is commercially allowable with, say, a 72-in. diameter boiler when "set" ready for use?

4. Has the oxy-acetylene welding process been sufficiently developed to warrant its use in boilermaking?

5. What is the relative value of Spellerized, American ingot iron and charcoal iron boiler tubes?

6. Electrolysis in boilers; has any one had any experience with it?

7. When boilers are not in use, which is the better method, to leave them full of water or empty them?

Colonel E. D. Meier, chairman of Committee on Uniform Boiler Specifications, read the report of that committee, which was unanimously adopted. The report, which is very long, recites the work done by the association along these lines and discusses in great detail the Massachusetts boiler rules, suggesting numerous changes in their phraseology.

L. E. Connelly of the D. Connelly Boiler Company, Cleveland, Ohio, made a strong plea for the passage of uniform laws for boiler inspection in all states as well as the Canadian Provinces. He gave a practical illustration of hardship in loss of time and money in a case where a boat was built for work in one harbor and upon being towed to another at great expense was at first ruled out of commission there because of different requirements as to the boilers than in the State where the boat had been built and the boilers installed and accepted.

The convention finally adjourned at noon on Thursday.

### Entertainment

At the banquet Thursday night at the St. Charles Hotel Colonel Meier officiated as toastmaster. An especially appreciated feature was the presentation in behalf of the Supplymen's Association by Thomas Aldcorn, of a silver set of five pieces to J. T. Corbett, reelected president of the associate members' organization. Toasts were responded to by J. W. Porch, president of the Progressive Union; John H. Murphy, of the Entertainment Committee; Secretary Farasey, whose poetical allusion to various members was very happy; Captain Cotter, who backed up what Mr. Porch had said about the need for a merchant marine; W. D. Sayle, of Cleveland, whose theme was "The Ladies," and W. P. Luck, who paid a high compliment to the work of Mr. Porch for New Orleans. All the ladies were presented with a silver souvenir spoon of New Orleans make and emblematic of the city.

The associate members held meetings coincidentally with the sessions of the parent body and reelected their former officers with one exception, the officers-elect being as follows: J. T. Corbett, president; Thomas Aldcorn, vice-president; H. B. Hare, treasurer; F. B. Slocum, secretary. Executive Committee, W. O. Duntley, chairman, Chicago; W. H. S. Bateman, Philadelphia; D. J. Champion, Cleveland; T. P. Wallace, St. Louis, Mo.; J. W. Porch, New Orleans, La. The Supplymen's Association officers are the same as the foregoing.

Elaborate arrangements for the entertainment of the ladies were carried out efficiently, including an automobile ride, reception and lunch on Tuesday; matinee at Dauphine Theater on Wednesday and a theater party at the Crescent for ladies and gentlemen on Wednesday night, a dinner following at the Grunewald Cave. On Thursday a boat ride and luncheon were enjoyed on the Sidney, viewing the harbor and the Mississippi River.

## Crucible Steel Company of America

The Crucible Steel Company of America reports the following profits for the six months ended February 29, 1912, compared with the corresponding period of the previous year:

| | 1912. | 1911. |
|---|---|---|
| *Profits | $1,576,230 | $1,363,557 |
| Contingent fund, corporation tax, etc. | 141,533 | 40,406 |
| Net profits | $1,434,696 | $1,323,151 |

*After deducting depreciation and repairs for 1912, $707,545; for 1911, $631,521.

The total net earnings, by months, were: September $306,452; October $459,570; November $374,985; December $361,598; January $410,151; February $371,018; total $2,283,775.

The National-Acme Mfg. Company, Cleveland, Ohio, reports a gratifying increase in business in its machinery department in the past few weeks. The company has received within the last few days a good number of foreign orders for automatic screw machines.

# United States Steel Corporation's 1911 Report

## Gross Receipts, $615,148,839.79. Decrease on Previous Year, $88,812,584.62, or 12 Per Cent. Net Earnings, $104,305,465.87. Decrease on Previous Year, $36,749,288.64, or 26 Per Cent.

The tenth annual report of the United States Steel Corporation, which covers the operations of the year ended December 31, 1911, makes an unfavorable showing, as compared with the excellent report for the preceding year. The gross sales and earnings decreased $88,812,584.62, or 12 per cent., while the net earnings decreased $36,749,288.64, or 26 per cent. The report, which covers operating results of all the subsidiaries, enables the following comparison of the financial result to be made:

### Income and Surplus

| | 1911. | 1910. |
|---|---|---|
| Gross receipts, sales and earnings | $615,148,839.79 | $703,961,424.41 |
| Manufacturing cost and ordinary maintenance | 488,134,474.11 | 529,215,788.12 |
| Administrative and general expenses | 16,554,152.67 | 17,155,807.27 |
| Taxes | 9,622,347.23 | 9,161,436.95 |
| Discounts and interest | 3,378,133.86 | 3,545,810.90 |
| Balance | 97,459,731.92 | 144,882,581.17 |
| Sundry manufacturing and operating revenues and rentals | 957,650.75 | 2,728,348.14 |
| Income from investments, etc. | 2,804,938.96 | 3,124,820.65 |
| Total income | 101,222,321.63 | 150,735,749.96 |
| Interest charges subsidiary companies | 8,037,695.19 | 7,263,453.66 |
| Balance | 93,184,626.44 | 143,472,296.30 |
| Net balance profits earned by subsidiary companies | 11,120,839.43 | 2,417,541.79 |
| **Net earnings** | **$104,305,465.87** | **$141,054,754.51** |
| Depreciation funds, etc. | 19,839,098.75 | 24,316,596.71 |
| Balance | 84,466,367.12 | 116,738,157.80 |
| Bond interest and sinking fund | 29,247,850.00 | 29,247,850.00 |
| Balance | 55,218,517.12 | 87,490,307.80 |
| Sundry credit adjustments | 81,779.66 | 83,122.98 |
| Total available for dividends, etc. | 55,300,296.78 | 87,407,184.82 |
| Preferred dividends paid | 25,219,677.00 | 25,219,677.00 |
| Common dividends paid | 25,415,125.00 | 25,415,125.00 |
| Balance, surplus | 4,665,494.78 | 36,772,382.82 |
| Appropriations for new construction, etc. | ..... | 26,000,000.00 |
| Balance carried to surplus | $4,665,494.78 | $10,772,382.82 |

The total surplus December 31, 1910, was placed at $164,143,157.99 in the general balance sheet, but it included the profits earned by subsidiary companies on inter-company sales of products. In the report for 1911 such profits are deducted from inventories by a change in the system of bookkeeping and the total surplus December 31, 1911, is thus shown to be $133,691,195.08. On this subject the report says: "While this change reduces the amount specifically shown in the balance sheet as surplus, such reduction does not mean a corresponding loss of value in assets, but merely transfers the profits in question to another location in the balance sheet, namely, as a deduction from gross values to the subsidiary companies of inventories on hand. Neither does the change affect in any way the currently reported earnings as heretofore compiled nor as they will hereafter be made up."

Among the charges for the year 1911 were $750,000 for discount in the sale of subsidiary companies' bonds and $663,018.37 appropriation for permanent pension fund. The latter is the first appropriation that has been made for this purpose.

### Production

The production of the subsidiary companies for the year 1911 compared with the year 1910 was as follows:

| Product. | 1911. Tons. | 1910. Tons. |
|---|---|---|
| Iron ore mined: | | |
| In the Lake Superior Ore Region: | | |
| Marquette Range | 560,685 | 830,094 |
| Menominee Range | 1,105,004 | 1,384,465 |
| Gogebic Range | 1,264,734 | 1,801,480 |
| Vermilion Range | 1,182,075 | 1,338,110 |
| Mesaba Range | 14,581,530 | 17,910,366 |
| Total Lake Superior | 18,694,068 | 23,264,515 |
| In the Southern Ore Region: | | |
| Tennessee Coal, Iron & R. R. Co.'s mines | 1,239,563 | 1,981,301 |
| Total | 19,933,631 | 25,245,816 |
| Coke manufactured: | | |
| In bee-hive ovens | 9,491,206 | 11,641,105 |
| In by-product ovens | 2,629,006 | 2,008,473 |
| Total | 12,120,212 | 13,649,578 |
| Coal mined, not including that used in making coke | 5,290,671 | 4,850,111 |
| Limestone quarried | 4,835,703 | 5,005,087 |
| Blast furnace production: | | |
| Pig iron | 10,593,726 | 11,645,510 |
| Spiegel | 66,435 | 102,260 |
| Ferromanganese and ferrosilicon | 84,736 | 83,628 |
| Total | 10,744,897 | 11,831,398 |
| Steel ingot production: | | |
| Bessemer ingots | 5,055,696 | 5,796,223 |
| Open hearth ingots | 7,697,674 | 8,383,146 |
| Total | 12,753,370 | 14,179,369 |
| Rolled and other finished steel products for sale: | | |
| Steel rails (heavy and light tee and girder) | 1,568,028 | 2,118,473 |
| Blooms, billets, slabs, sheet and tin plate bars | 874,474 | 682,364 |
| Plates | 630,512 | 929,020 |
| Heavy structural shapes | 547,186 | 656,797 |
| Merchant steel, bars, hoops, bands, skelp, etc. | 1,221,606 | 1,527,506 |
| Tubing and pipe | 863,670 | 868,550 |
| Wire rods | 118,302 | 133,722 |
| Wire and products of wire | 1,613,754 | 1,490,318 |
| Sheets (black and galvanized) and tin plate | 1,079,046 | 1,082,787 |
| Finished structural work | 518,399 | 589,228 |
| Angle splice bars and all other rail joints | 160,855 | 235,998 |
| Spikes, bolts, nuts and rivets | 60,386 | 71,326 |
| Axles | 52,046 | 101,066 |
| Steel car wheels | 36,652 | 98,105 |
| Sundry steel and iron products | 131,332 | 148,735 |
| Total | 9,476,248 | 10,733,995 |
| Spelter | 28,333 | 26,777 |
| Sulphate of iron | 28,381 | 33,684 |
| | Bbls. | Bbls. |
| Universal Portland cement | 7,737,500 | 7,001,500 |

The G. Drouve Company, Bridgeport, Conn., has been awarded the contract for 7000 lineal feet of Straight-Push sash operator for use in connection with Fenestra steel sash, which will go into all of the shop buildings now being constructed at the Pearl Harbor naval station at Honolulu. This is particularly interesting as it shows the economical advantage possible with the Straight-Push sash operator. Very recent contracts have been received from the Ford Motor Company, Cotton Belt Railroad, Seaboard Air Line Railroad, Continental Motor Car Company and Ford Plate & Window Glass Company.

The Electric Controller & Mfg. Company, Cleveland, Ohio, has opened a Canadian office in the Traders' Bank Building, Toronto, Ontario.

## Interesting Fire Engine Equipment

A somewhat novel and interesting fire protection equipment has been recently built for the village of Navesink, N. J., by the Red Bank Garage Company. This engine consists of a No. 3 bronze fitted rotary pump made by the Goulds Mfg. Company, Seneca Falls, N. Y., mounted in a 60-h.p. Thomas car. The pump is driven by the same engine that operates the car at a speed of 350 r.p.m. and has a delivery of approximately 400 gal. per minute. The suction pipe is 5 in. in diameter, while the discharge pipe is only one-half as large. The weight of the equipment is about 4000 lb. and the over-all length is 17 ft. In a recent test of the equipment a stream was thrown 100 ft. with a pressure of 140 lb. at the hydrant and a solid stream was thrown to a hight of 85 ft. through 750 ft. of 2½-in. hose.

# THE IRON AGE

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## Renewed Hope for Patent Law Revision

Waiving the question whether there will be a rehearing of the patent law case Sydney Henry vs. A. B. Dick Company, decided by the United States Supreme Court last week, it is gratifying that what has occurred has thrown a strong light afresh upon the crying need for general revision of our patent laws. The decision, upholding the right of the manufacturer of a patented rotary mimeograph to limit the purchaser to using certain supplies with it, was reached by a divided bench, four justices concurring in the prevailing opinion, while three, one of them the Chief Justice, dissented, one justice not participating and one seat being vacant. A reversal upon rehearing could therefore readily occur.

It is difficult for the lay mind to discern precisely how the respective groups of justices, those concurring and those dissenting, drew the line, in arriving at their conclusions, between the mere letter of the law and the general question of public policy. Yet is seems clear that such an issue was involved, for Justice Lurtin in announcing the decision remarked that it resulted from a proper construction of the patent statutes, and he took pains to say that if such conditions interfered with public policy Congress alone must change the patent law. At the same time the Chief Justice said plainly that the dissenting opinion was written with a view to helping the situation, in that Congress must act if "untold evils" were not to follow.

Agitation for a revision of the patent laws began many years ago among those who secure and use patents. Without going into the details of the claims, it should be emphasized that the need for reform originally grew out of the multiplying of patents. It was a case of the system itself producing the evils which its perpetuation as a success required to be provided against. Every year has added to the complications, with the enormous number of patents granted, and the growing practice of securing patents, not with the direct aim of protecting a clear-cut invention from competitive use, but for ulterior purposes, as the laying of a foundation for future patents of utility by the patentee, or of blocking the way of other inventors towards patents.

Conditions years ago reached such a point that it became questionable whether the whole patent system was a benefit or an injury to the public. It was founded to benefit the people by rewarding those who invent things, on the principle that otherwise they would not invent them. Cogent arguments can be adduced for the proposition that as matters work out at present the system retards rather than advances progress. It is not as necessary as it formerly was to encourage invention by specific reward. The tendency does not require encouragement to the former extent. Good things are more readily recognized. There is more demand for them. This arises through many influences. Society is better organized. The channels by which a new idea can be tried out are freer, and there is a vastly greater demand for new ideas, for men have learned the lesson that there are new ideas to be found. The period of the lone inventor burning his midnight oil has given way to the period of co-operative effort and free interchange of ideas. Human nature has changed. We were all amused, only a few years ago, at the anecdote of the crowd jeering Fulton when a little difficulty with the machinery delayed the start for that memorable trip up

the Hudson in 1807. The crowd of to-day does not jeer, and becomes unplesantly tumultuous only when there is a question of return of gate-money.

If to the already recognized evils of our patent system there is to be added the restraint of trade which it is clearly seen is likely to follow last week's Supreme Court decision, the duty of Congress to take up immediately a general recasting of our patent laws is made imperative. The enormous expense involved in the maintenance of the patent bureaus of some of the large manufacturing concerns is in its essence a restraint of trade; to a large extent the expenditure is a loss incurred by individuals without corresponding return either to them or to society at large. If the ownership of a patent by a manufacturer is to give him greater authority than has formerly been recognized, in decreeing how his customers may conduct their business, which the authorities insist this decision will do, restraint of trade is being encouraged.

Intimidation is unfair competition, and intimidation for the purpose of furthering the sale of alleged patented articles has been a growing evil for years. With the multiplying of patents and the multiplying of costs in patent litigation there is a continual increase in the handicap of the prospective buyer of an article in which rival claims exist. Last week's decision opens the way for "untold evils," to repeat Chief Justice White's phraseology, in the practice of intimidation upon those who have purchased and paid for an article alleged to be patented.

It is common sense that when a patented article has been sold and paid for the rights of the seller should, in general, be regarded as terminated, and any extension or continuance of authority upon the part of the one who has sold the article should be granted only with the utmost reserve and circumspection. If the present patent law does not involve the utmost reserve, it should be amended. If, even with such reserve, the rights granted are seen to have a tendency to restrain trade or encourage intimidation, the fact should be recognized frankly as one clear-cut argument why we should have no patent system at all. The whole patent system is up for judgment.

## Controlling Sickness in Industrial Works

In connection with its system of taking care of the health of its employees, the Norton Company, Worcester, Mass., has made a careful analysis of the time lost by workmen because of sickness. It will be remembered that this company regularly employs a physician who gives a great deal of his time to the work. The physical condition of employees has been tabulated, affording an accurate basis for the study of individual cases. The loss to a manufacturing establishment due to the absence of workmen may be a serious one. At times of epidemics the resultant decrease in shop production may be so serious as to constitute the difference between a profit and a loss. Sickness is a greater disorganizer than accidents in this respect.

The Norton Company offers the services of the physician free to all of its employees. The men are urged to call upon him at the works hospital no matter how trifling their ailments may be. Immediate treatment by a skillful practitioner heads off serious sickness in a large proportion of cases. The difference has recently been demonstrated in an interesting way. An epidemic of severe "grippy" colds went through the plant. The history of the cases of 30 men was studied. Of these 15 went directly home without consulting the company's physician and 15 went to the works hospital for treatment. Of the latter group each man returned to work after having his throat treated antiseptically and receiving the requisite medicine. None lost an hour. Of the other group, however, the average loss of time was large. The tendency of an able bodied man is to regard a cold as something that will take care of itself, and of the men who went home hardly one had the services of a doctor and their sickness was permitted to run its full course, with the consequent effects upon their systems.

The company's statistics show that the absence of the men treated by the works physician averages 18 working hours, while the average absence of those who are not thus treated is 36 working hours. Considering that many hundreds of hours are lost through sickness, to cut this waste in two is to obtain a materially greater efficiency.

The physician is kept informed all of the time as to those who are out of the works because of physical incapacity, a report of each case being made to him by the foreman. Upon a man's return to work he is required to call upon the physician, who ascertains what the trouble has been and makes a record on the workman's individual card. The expectation is that all employees will come to realize the practical value to them of the services rendered by the medical department.

## The Steel Corporation's Output in 1911

From time to time in 1911 attention was called in market reports to indications that the United States Steel Corporation was booking a larger share of business than it had been taking in the immediately preceding years of co-operation among steel manufacturers. The report of the Steel Corporation, which appears this week, gives some basis for comparisons, but these cannot be made complete since the statistics of the country's steel production in 1911 are not yet available.

Referring first to Lake Superior ore shipments, those of the Steel Corporation in 1911 were 17,282,499 gross tons against 22,185,972 tons in 1910. The shipments of other producers of Lake Superior ores last year were 15,510,631 tons against 21,256,425 tons in 1910. Thus the Steel Corporation's percentage of the total shipments was 52.7 last year as compared with 49.86 in 1910. The distinction is to be made between shipments of Lake ores and production. The Steel Corporation actually mined 18,694,068 tons in 1911 and 23,264,515 tons in 1910, or 1,411,569 and 1,078,543 tons, respectively, in excess of the ore shipped in these two years.

The pig iron production of the Steel Corporation last year was 10,744,897 tons; in 1910 it was 11,831,398 tons. Its percentage of the country's total last year was 45.4, whereas in 1910 it was 43.3.

The steel ingot production of the Steel Corporation was 12,753,370 gross tons last year and in the preceding year 14,179,369 tons. In 1910 the corporation produced 54.3 per cent. of the total for the country, our steel ingot production that year running up to the unprecedented total of 26,094,919 tons. If the Steel Corporation produced only the same percentage last year as in 1910 the country's production of steel ingots in 1911, of which official figures will soon be made public,

would stand at 23,486,868 gross tons. The indications are, however, that with its heavy exports last year, which were 1,746,000 tons as against 1,223,031 tons in 1910, the Steel Corporation made a larger percentage of the ingot total than in 1910 and, therefore, that the country's production of steel ingots last year was nearer to 23,000,000 tons than to the figure given above.

In finished products the conspicuous exception to the declines from Steel Corporation tonnages of 1910 is in the item of "wire and products of wire." In spite of the fact that it had more competition in wire products last year than in any year that preceded, the corporation made a new record with a production of 1,613,754 net tons as against 1,490,318 net tons in 1910, and a previous high record of 1,607,689 tons in 1909. In sheets and tin plate the two years ran very close, with totals of 1,079,046 gross tons for 1911 and 1,082,787 tons for 1910. The tubing and pipe output last year was likewise close to that of 1910, the figures being 862,670 gross tons and 868,550 tons respectively. There was a great falling off in steel rails—from 2,118,473 gross tons in 1910 to 1,568,028 tons. The falling off in plates was pronounced, due to the meager steel car business, slackness in shipyards and the shrinkage of boiler and tank work, the total for 1911 being but 630,512 tons, against 929,020 tons in 1910. Finished structural work fell off from 589,228 tons in 1910 to 518,399 tons last year, and heavy structural shapes, sold in that form, from 656,797 tons to 547,186 tons. Of all finished forms of steel the 1910 total was 9,476,248 tons, against 10,733,995 tons in 1910, a falling off of 11.7 per cent.

From present indications the Steel Corporation's 1912 percentage of the country's pig iron, steel ingot and rolled iron and steel production will be somewhat larger than that of last year and a considerable increase will probably be shown also upon its tonnage record of 1911.

## The Rail Situation More Hopeful

The New York Central's Twentieth Century train was derailed last week and following it has come another flood of rail failure literature. Practically all the newspaper comment treats the case as one of defective rail, and again the railroads and the rail manufacturers, particularly the latter, have been brought in judgment before an excited and uninformed public. Again remedies have been urged, based on such statements as that the broken rail "*did not contain enough carbon* and was therefore brittle"; that in these days of large capitalization and strain for dividends rails are turned out too fast in the mills; that roadbeds have not been built to stand the attack of the heavy high-speed trains of to-day; that the rails are not properly fastened to the ties—and so on. Most of it was said at the time of the last preceding accident in which there was a broken rail.

It is perhaps not material to the main discussion that the primary cause of the Hyde Park accident was not a broken rail, though it is shown that the rail, before it broke, was turned outward from a cause not yet determined, the break occurring when the driving wheels were running along the side of the rail, between the base and the head. What is particularly impressive in the newspaper communications and interviews of the past week is the aroused state of public opinion on the question of safety in travel and the feeling that the risk has increased in recent years. While such agitation is to be expected, with all its inaccuracies and sensationalism, its most deplorable feature is that writers who should know what is being done by the railroads and the steel makers to make safer roadbeds and safer rails utterly ignore all that side of the question. The meeting of presidents of railroads and presidents of steel companies in New York on February 15 and the discussions there were only made possible by the four years of good work on the rail problem by joint committees of rail makers and rail users. The American Railway Association has been steadily at work at the same time through its own committee of railroad officials and engineering experts. Concurrently the steel companies have worked without ceasing to improve their product. This week a meeting of the joint committee of railroad and steel company presidents is being held that will set the question further on toward a better solution.

The newspapers owe it to the public to tell it something of this remedial work and of the concentration upon it of the best talent in railroad and steel works engineering. The inquiries by State and Government commissions, which are urged in various directions, would have to begin back where the existing committees started several years ago, and their investigations would simply traverse the same road that has already been traveled in getting data for the volumes already produced to throw light on the intricacies of the problem. Some of the newspaper writers seem not to know that the accusation and recrimination stage of the agitation has been passed. If they had read what has appeared in *The Iron Age* they would have known that on each side there is a better appreciation than has ever existed of the problems with which the other has to deal. Steel companies admit that with all the progress of recent years there is much they must yet master if they would meet the latest demands upon rail steel. Railroad officers themselves have raised the question whether the limit of safety has not been too closely approached by present-day wheel loads.

Those who know most about the manufacture of high grade rail steel on the one hand and the conditions of rail service on the other hand are now more disposed than ever to recognize their mutual interest and obligation in insuring maximum safety in travel. Unfortunately this has not always been the case. That it is so now is more important than any suggestion that has been thrown out in the late discussion and is the most reassuring feature of the whole rail situation to-day.

## Machinery Dealers and Auction Sales

During the past week, as mentioned elsewhere in this issue, the machinery equipment of a plant near Chicago, for some time idle, was sold at auction. Such sales have occurred not infrequently. A similar one of even larger volume is to be held within the Chicago territory in the near future. It has been the unvarying experience, in connection with sales of this character, that prospective purchasers not only refrain from buying new or second-hand tools through the regular channels in anticipation of possible bargains at such auction sales, but have been known to actually cancel orders for the same reason. It has been noticeable that for several days around the date of such sales inquiry for tools in the territory affected is greatly reduced.

It is apparent that legitimate machine tool dealers are the ones most affected by sales of this character and yet such dealers have apparently neglected any initiative in the direction of securing the disposal of such equipment to their own advantage. It is true almost without exception that the opportunity for obtaining the equipment in bulk is left open for a broker or wrecking company to whom the dealer at a subsequent auction sale ordinarily pays a handsome commission.

## Philadelphia Associated Foundry Foremen

The regular monthly meeting of the Associated Foundry Foremen of Philadelphia was held on the evening of March 12, in Park Avenue Hall, with Clarence R. Brown presiding. Announcement was made that as the result of a mail vote the meeting night would be changed from the second Tuesday to the second Wednesday of each month, and Room No. 1, Columbia Hall, 1325 Columbia avenue, would be the permanent quarters.

The paper for the evening's discussion was on "Electric Arc Welding," by B. M. Bowers, Chester, Pa., a practical welder. In addition to his paper, which appears on another page in this issue, the question of the successful electric welding of gray iron castings was discussed. In this connection, Mr. Bowers said that further precautions beyond those observed in welding steel castings are necessary. The casting should be preheated to about a cherry red temperature, and must be slowly cooled after the welding has been accomplished. This is best done in an annealing furnace, or the casting must be packed in sand or other material to retard cooling. Quick cooling always results in hard spots. It is further advisable to heat twice the area usually heated in steel casting work to insure a gradual cooling, not only at the weld, but the metal adjacent to it. Doubtful results attend the use of ordinary gray iron as a filler in making gray iron welds. It is preferable to use high silicon pig iron, or, if this is not available, a flux, such as dehydrated borax, should be used.

## Shipments of Two Ferroalloys in 1911

The Bulletin of the American Iron and Steel Association gives the following data concerning shipments of ferrotitanium and ferrovanadium in this country in 1911:

In the calendar year 1911 3,679,335 lb. (1,643 gross tons) of ferrotitanium alloy were shipped by an American producer to 79 manufacturers of steel in the United States. Of the total quantity shipped 20 plants which make ingots but not castings purchased 525,295 lb., 44 plants which make castings but not ingots purchased 136,425 lb., and 15 plants which make both ingots and castings purchased 3,017,615 lb. In addition 129,440 lb. was exported. The average consumption of ferrotitanium in the manufacture of steel is about 0.4 per cent., or about 8.96 lb. per gross ton. The Vanadium Sales Company of America in the calendar year 1911 shipped 689,510 lb. of ferrovanadium to 57 plants in the United States and Canada, which manufacture steel ingots or castings.

## Rhode Island Metal Trades Meeting

The Rhode Island Branch, National Metal Trades Association, had its annual meeting and dinner at the Churchill House, Providence, the evening of March 14. The attendance was large, and the other New England branches were represented. Officers were elected as follows: President, E. A. Beaman, Beaman & Smith Company, Providence; vice-president, J. E. Osgood, J. M. Carpenter Tap & Die Company, Pawtucket; treasurer, J. G. Aldrich, New England Butt Company, Providence. Executive Committee, William H. Tether, Maxwell-Briscoe Company; H. L. Scott, Henry L. Scott & Co.; J. Morpeth, Brown & Sharpe Mfg. Company, and D. K. Bartlett, Builders Iron Foundry, all of Providence. President Beaman was the toastmaster. A pleasant incident was the presentation to Mr. Beaman of a splendid floral horseshoe, a gift of the members. The speakers of the evening were M. W. Alexander, of the General Electric Company, Lynn, Mass., who took for his topic the workmen's compensation laws, paying especial attention to the Rhode Island law, and William J. Burns, the detective, who discussed the MacNamara cases and the great dynamite conspiracy.

## Eight-Hour Shifts at Iron Mines

### The New Schedule in the Lake Superior Region

MARQUETTE, Mich., March 16.—The adoption of the eight-hour shift in all underground mines in the Lake Superior iron district marks one of the most important industrial developments that has taken place in the region in years. The action of the various operators was entirely voluntary. The iron miners have long wanted the eight-hour shift, although no general demand for it has ever been made. The shorter work day has been in effect at a number of mines, among these the Marquette range properties of the Jones & Laughlin Steel Company and the E. N. Breitung interests, with the result that these mines have been most popular with the workmen. From the point of efficiency in operation it is claimed that experience in actual mine working clearly gives the palm to the eight-hour plan. When the mines are being wrought at high pressure it lends itself to the latest and most economical results. The workers like it, for it means more time in the sunlight and more time for their families and their homes.

Under the new arrangement, the underground men—those employed on company account—will be paid the same wages as with the 10-hour work day in effect. The shorter shift will mean some increase in the normal forces, although not for the time being, the production of the region as a whole still being well under capacity, influenced by trade conditions. There will be no change in the working plan at the mines where eight-hour shifts have been employed in the past. Neither will the surface employes in general be affected. At many mines much of the mining is done by contract. The new plan does not affect the men employed under this system, and they will continue to work such hours as they choose, so long as contracts are completed on time. The miner employed at regular wages, while required to work 10 hours, really has been on duty nearly 12 hours, this because of the necessity of changing his clothes at both ends of the shift and being on hand at stated times, prepared to be lowered into the shaft or hoisted from it. He is now on the same basis as the surface employe.

The new system provides an actual working day underground from 8 a. m. to 5 p. m., with one hour for dinner. At night the shift is from 8 p. m. to 5 a. m., with an hour for lunch at midnight. This means that underground workers who formerly were compelled to leave home at 6 o'clock or shortly thereafter, in order to "change" at the "dry" and be ready to go underground at 7 o'clock, now leave home an hour later, and that at the end of the shift they go to the "dry" and change and reach home before 6 o'clock. It also means fewer hours each week for the engineers and brakemen, who have had to be in the engine houses 20 to 30 minutes beforehand in order to have everything in readiness to lower the underground workers into the mine without delay at the starting of the shift.

## Treadwell Electric Steel Castings

The Treadwell Engineering Company, Easton, Pa., now has in successful operation a two-ton electric furnace for the manufacture of steel castings, and has discontinued making crucible steel castings. While the general range of work comprises 15 to 20 lb. castings, up to 100 lb. can now be furnished. The company is also in a position to specially heat-treat castings made by this process, if desired.

The Treadwell Engineering Company now has the equipment of its former Lebanon and Myerstown plants all in operation at its present location. Its new plant is about 95 per cent. completed, and is being operated at about 60 per cent. of full capacity. This plant is located on a tract of 20 acres, adjacent to Easton. With the exception of steam for heating purposes, electric power is used throughout, current being furnished by a nearby power company, using water power for its generation. The current is delivered at 11,000 volts and stepped down in a special transformer house for the various purposes for which it is used.

S. DIESCHER & SONS.
Mechanical and Civil Engineers
PITTSBURGH, PA.

# The Iron and Metal Markets

## A Stand for Higher Prices

### Steel Companies Advance Plates, Structural Shapes and Bars

### Light Rails Higher—Some Stir in Lake Ore—Foundry Iron More Active

The steel companies for the time being are putting more stress on establishing an advance in prices and their efforts in that direction have met with some success. The Carnegie Steel Company began this week to ask 1.20c. Pittsburgh for plates and structural shapes and 1.15c. for steel bars. A similar stand had previously been taken by an independent company at Buffalo and others are reported to be holding for this basis.

It cannot be said that on a good specification 1.15c. would not be accepted by some mill for plates and shapes or that bars could not be had at 1.10c., but the finished material market throughout is firmer, and the advance of the open season and the demand coming with it are counted on as sustaining factors.

In the case of the Steel Corporation the position appears to be that with 5,450,000 tons of unfilled orders on its books March 1, about 2,000,000 tons of it being covered by specifications, it can turn from the pursuit of tonnage at the expense of prices and bend its efforts to the repair of profits. Other manufacturers, particularly of bars, are not less anxious for the same end.

A leading ore firm has sold lots of Bessemer and non-Bessemer ore in the past 10 days aggregating nearly 1,000,000 tons at prices lower than were generally expected. Ore has been offered at $3.05 for Old Range non-Bessemer and $2.85 for Mesaba non-Bessemer, a reduction of 65 cents as compared with last year's prices, and it is understood that sales were made on about that basis. It is reported that more than a 65 cent reduction is being made on Bessemer grades. It is just becoming known that considerable ore tonnage has been sold in the past two months at greatly reduced prices. The ore producers will receive some offset against lower selling prices through reductions in Mesaba rail freights, lower dock unloading charges and cheaper vessel rates.

Foundry pig iron markets have been more active and have stiffened considerably. One New York State buyer has taken 5000 tons of malleable with an equal amount of basic, and another has bought 6000 to 8000 tons of foundry iron. At Pittsburgh a sale of 5000 tons of No. 2 foundry iron was made at $13, Valley furnace, but $13.25 is now minimum. Southern irons have sold at $10.25 to $10.50 Birmingham.

Further basic pig iron sales have been made in the Central West and for second quarter iron $13 at Valley furnace has been paid. The Steel Corporation has made no purchases thus far. In southern Ohio 20,000 tons of basic has been bought and more is under inquiry.

In semi-finished steel leading Pittsburgh mills are heavily booked. An inquiry for a round tonnage of open-hearth billets has come from the Canadian company that has recently been in the market for basic and Bessemer pig iron.

While it is expected that work will stop in the anthracite region April 1, an adjustment is looked for without the development of an acute situation. A bituminous strike is considered less likely. The excitement in coke has continued and high prices have been paid, particularly by foundries. The situation has been aggravated by the using of loaded coal cars for storage purposes by Western shippers.

Railroad buying is rather freer. The Wabash has placed 15,000 tons more of rails, which went to Buffalo, and the Harriman lines and the Atchison are expected to come into the market soon. The New Haven bought 11,000 tons from the Pennsylvania Steel Company, and will need several thousand tons additional. Light rails have been advanced $1.50 a ton at Pittsburgh for 8 to 20 lb. sections and $2 a ton for 25 to 40 lb. Car orders include 2500 for the Western Maryland, 700 steel underframes for the Rock Island and 300 cars for the Wabash.

As bearing on the latest agitation over rail quality, the service of 6000 tons of electric steel rails rolled at South Chicago and now in track on Western and Northwestern roads is cited. No failures have been reported and these rails have been in service one, two and three years.

Fabricating contracts indicate that sharp competition is still the rule. Out of 75,000 tons let since March 1 about 17,000 tons was taken by the leading interest. In New York City several large buildings are being figured on—those of Stern Brothers and the Adams Express Company, 6000 tons each, and the Grand Central hotel, 10,000 tons.

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## A Comparison of Prices

**Advances Over the Previous Week in Heavy Type. Declines in Italics.**

At date, one week, one month and one year previous.

| | Mar. 20, 1912. | Mar. 13, 1912. | Feb. 21, 1912. | Mar. 22, 1911. |
|---|---|---|---|---|
| **Pig Iron,** Per Gross Ton: | | | | |
| Foundry No. 2 standard, Philadelphia | **$15.00** | $14.85 | $14.85 | $15.50 |
| Foundry No. 2, Valley furnace | **13.25** | 13.00 | 13.00 | 13.75 |
| Foundry No. 2, Southern, Cincinnati | 13.50 | 13.50 | 13.25 | 14.25 |
| Foundry No. 2, Birmingham, Ala. | 10.25 | 10.25 | 10.00 | 11.00 |
| Foundry No. 2, at furnace, Chicago* | 14.00 | 14.00 | 14.00 | 15.50 |
| Basic, delivered, eastern Pa. | **14.50** | 14.25 | 14.25 | 15.25 |
| Basic, Valley furnace | **13.00** | 12.85 | 12.25 | 13.75 |
| Bessemer, Pittsburgh | 15.15 | 15.15 | 14.90 | 15.90 |
| Malleable Bessemer, Chicago | 14.00 | 14.00 | 14.00 | 15.50 |
| Gray forge, Pittsburgh | 13.40 | 13.40 | 13.40 | 14.40 |
| Lake Superior charcoal, Chicago | 15.75 | 15.75 | 16.00 | 17.50 |
| **Billets, etc.,** Per Gross Ton: | | | | |
| Bessemer billets, Pittsburgh | $19.50 | $19.50 | $20.00 | $23.00 |
| Open hearth billets, Pittsburgh | 19.00 | 19.00 | 20.00 | 23.00 |
| Forging billets, Pittsburgh | 26.50 | 26.50 | 28.00 | 28.00 |
| Open hearth billets, Philadelphia | 22.40 | 22.40 | 22.40 | 25.40 |
| Wire rods, Pittsburgh | 25.00 | 25.00 | 25.00 | 29.00 |
| **Old Material,** Per Gross Ton: | | | | |
| Iron rails, Chicago | $15.00 | $15.00 | $15.00 | $14.50 |
| Iron rails, Philadelphia | 15.50 | 15.50 | 15.50 | 18.50 |
| Car wheels, Chicago | 13.00 | 13.00 | 13.00 | 13.25 |
| Car wheels, Philadelphia | 11.75 | 11.75 | 12.00 | 14.00 |
| Heavy steel scrap, Pittsburgh | **13.00** | 12.75 | 12.00 | 14.00 |
| Heavy steel scrap, Chicago | 10.75 | 10.75 | 10.50 | 12.00 |
| Heavy steel scrap, Philadelphia | 11.75 | 11.75 | 11.75 | 14.00 |

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

| Finished Iron and Steel, Per Pound to Largest Buyers: | Mar. 20, 1912. Cents. | Mar. 13, 1912. Cents. | Feb. 21, 1912. Cents. | Mar. 22, 1911. Cents. |
|---|---|---|---|---|
| Bessemer rails, heavy, at mill | 1.25 | 1.25 | 1.25 | 1.25 |
| Iron bars, Philadelphia | 1.22½ | 1.22½ | 1.25 | 1.37½ |
| Iron bars, Pittsburgh | 1.25 | 1.25 | 1.25 | 1.35 |
| Iron bars, Chicago | 1.15 | 1.15 | 1.15 | 1.27½ |
| Steel bars, Pittsburgh | 1.10 | 1.10 | 1.10 | 1.40 |
| Steel bars, tidewater, New York | 1.26 | 1.26 | 1.26 | 1.56 |
| Tank plates, Pittsburgh | **1.15** | 1.10 | 1.10 | 1.40 |
| Tank plates, tidewater, New York | 1.26 | 1.26 | 1.26 | 1.56 |
| Beams, Pittsburgh | 1.15 | 1.15 | 1.10 | 1.40 |
| Beams, tidewater, New York | *1.26* | 1.31 | 1.26 | 1.56 |
| Angles, Pittsburgh | 1.15 | 1.15 | 1.10 | 1.40 |
| Angles, tidewater, New York | *1.26* | 1.31 | 1.26 | 1.56 |
| Skelp, grooved steel, Pittsburgh | 1.10 | 1.10 | 1.12½ | 1.30 |
| Skelp, sheared steel, Pittsburgh | 1.15 | 1.15 | 1.20 | 1.35 |
| **Sheets, Nails and Wire,** Per Pound to Largest Buyers: | Cents. | Cents. | Cents. | Cents. |
| Sheets, black, No. 28, Pittsburgh | 1.80 | 1.80 | 1.85 | 2.20 |
| Wire nails, Pittsburgh | 1.60 | 1.60 | 1.60 | 1.80 |
| Cut nails, Pittsburgh | 1.55 | 1.55 | 1.55 | 1.70 |
| Fence wire, ann'led, 0 to 9, P'gh. | 1.40 | 1.40 | 1.40 | 1.60 |
| Barb wire, galv., Pittsburgh | 1.90 | 1.90 | 1.90 | 2.10 |
| **Coke, Connellsville,** Per Net Ton, at Oven: | | | | |
| Furnace coke, prompt shipment | **$2.25** | $2.15 | $1.75 | $1.55 |
| Furnace coke, future delivery | **2.25** | 2.15 | 1.80 | 1.75 |
| Foundry coke, prompt shipment | **2.75** | 2.50 | 2.10 | 2.00 |
| Foundry coke, future delivery | 2.50 | 2.50 | 2.25 | 2.25 |
| **Metals,** Per Pound: | Cents. | Cents. | Cents. | Cents. |
| Lake copper, New York | **14.75** | 14.62½ | 14.50 | 12.50 |
| Electrolytic copper, New York | **14.62½** | 14.50 | 14.37½ | 12.25 |
| Spelter, St. Louis | *6.90* | 7.00 | 6.55 | 5.50 |
| Spelter, New York | *7.05* | 7.15 | 6.70 | 5.65 |
| Lead, St. Louis | **4.05** | 3.92½ | 3.95 | 4.25 |
| Lead, New York | **4.10** | 4.00 | 4.00 | 4.40 |
| Tin, New York | *42.15* | 42.25 | 42.87½ | 40.50 |
| Antimony, Hallett, New York | 7.37½ | 7.37½ | 7.37½ | 9.12½ |
| Tin plate, 100-lb. box, New York | $3.54 | $3.54 | $3.54 | $3.94 |

## Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific Coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter, 65c. on wrought pipe and boiler tubes.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

| Extras. | Cents per lb. |
|---|---|
| Gauges under ¼ in. to and including 3-16 in. on thinnest edge | .10 |
| Gauges under 3-16 in. to and including No. 8 | .15 |
| Gauges under No. 8 to and including No. 9 | .25 |
| Gauges under No. 9 to and including No. 10 | .30 |
| Gauges under No. 10 to and including No. 12 | .40 |
| Sketches (including all straight taper plates) 3 ft. and over in length | .10 |
| Complete circles, 3 ft. in diameter and over | .20 |
| Boiler and flange steel | .10 |
| "A. B. M. A." and ordinary firebox steel | .20 |
| Still bottom steel | .30 |
| Marine steel | .40 |
| Locomotive firebox steel | .50 |
| Widths over 100 in. up to 110 in., inclusive | .05 |
| Widths over 110 in. up to 115 in., inclusive | .10 |
| Widths over 115 in. up to 120 in., inclusive | .15 |
| Widths over 120 in. up to 125 in., inclusive | .25 |
| Widths over 125 in. up to 130 in., inclusive | .50 |
| Widths over 130 in. | 1.00 |
| Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive | .25 |
| Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive | .50 |
| Cutting to lengths or diameters under 1 ft. | 1.55 |

No charge for cutting rectangular plates to lengths 3 ft. and over.

**Wire Rods and Wire.**—Bessemer, open hearth and chain rods, $25. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.40; galvanized, $1.70. Carload lots to retailers, annealed, $1.50; galvanized, $1.80. Galvanized barb wire to jobbers, $1.90; painted, $1.60. Wire nails, to jobbers, $1.60.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

*Fence Wire, Per 100 Lb.*

| Nos. | 0 to 9 | 10 | 11 | 12 & 12½ | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Annealed | $1.55 | $1.60 | $1.65 | $1.70 | $1.80 | $1.90 | $2.00 | $2.10 |
| Galvanized | 1.85 | 1.90 | 1.95 | 2.00 | 2.10 | 2.20 | 2.60 | 2.70 |

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in., on one or both legs, ¼ in. and over, 1.15c. Other shapes and sizes are quoted as follows:

| | Cents per lb. |
|---|---|
| I-beams over 15 in. | 1.20 to 1.25 |
| H-beams over 18 in. | 1.20 to 1.25 |
| Angles over 6 in. | 1.20 to 1.25 |
| Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909 | 1.20 to 1.25 |
| Tees, 3 in. and up | 1.20 to 1.25 |
| Zees, 3 in. and up | 1.15 to 1.20 |
| Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909 | 1.20 to 1.25 |
| Deck beams and bulb angles | 1.45 to 1.50 |
| Hand rail tees | 2.00 to 2.15 |
| Checkered and corrugated plates | 2.00 to 2.15 |

**Sheets.**—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows:

*Blue Annealed Sheets.*

| | Cents per lb. |
|---|---|
| Nos. 3 to 8 | 1.20 to 1.25 |
| Nos. 9 and 10 | 1.30 to 1.35 |
| Nos. 11 and 12 | 1.35 to 1.40 |
| Nos. 13 and 14 | 1.40 to 1.45 |
| Nos. 15 and 16 | 1.50 to 1.55 |

*Box Annealed Sheets, Cold Rolled.*

| | One Pass. | Three Pass. |
|---|---|---|
| Nos. 10 to 12 | 1.45 to 1.50 | ..... |
| Nos. 13 and 14 | 1.50 to 1.55 | ..... |
| Nos. 15 and 16 | 1.55 to 1.60 | 1.65 to 1.70 |
| Nos. 17 to 21 | 1.60 to 1.65 | 1.70 to 1.75 |
| Nos. 22, 23 and 24 | 1.65 to 1.70 | 1.75 to 1.80 |
| Nos. 25 and 26 | 1.70 to 1.75 | 1.80 to 1.85 |
| No. 27 | 1.75 to 1.80 | 1.85 to 1.90 |
| No. 28 | 1.80 to 1.85 | 1.90 to 1.95 |
| No. 29 | 1.85 to 1.90 | 1.95 to 2.00 |
| No. 30 | 1.95 to 2.00 | 2.05 to 2.10 |

*Galvanized Sheets of Black Sheet Gauge.*

| | |
|---|---|
| Nos. 10 and 11 | 1.80 to 1.85 |
| Nos. 12, 13 and 14 | 1.90 to 1.95 |
| Nos. 15, 16 and 17 | 2.05 to 2.10 |
| Nos. 18 to 22 | 2.20 to 2.25 |
| Nos. 23 and 24 | 2.30 to 2.35 |
| Nos. 25 and 26 | 2.50 to 2.55 |
| No. 27 | 2.65 to 2.70 |
| No. 28 | 2.80 to 2.85 |
| No. 29 | 2.90 to 2.95 |
| No. 30 | 3.10 to 3.15 |

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations.

*Corrugated Roofing Sheets Per Square.*

| Gauge. | Painted. | Galvanized. | Gauge. | Painted. | Galvanized. |
|---|---|---|---|---|---|
| 29 | .... | $2.20 | 23 | $2.25 | $3.35 |
| 28 | $1.30 | 2.45 | 22 | 2.40 | 3.50 |
| 27 | 1.40 | 2.50 | 21 | 2.60 | 3.85 |
| 26 | 1.50 | 2.55 | 20 | 2.85 | 4.15 |
| 25 | 1.70 | 2.90 | 18 | 3.80 | 5.40 |
| 24 | 1.95 | 3.00 | 16 | 4.55 | 6.25 |

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from December 1, 1911; galvanized iron pipe, from March 1, 1912:

*Butt Weld.*

| | Steel Black. | Steel Galv. | Iron Black. | Iron Galv. |
|---|---|---|---|---|
| ⅛ and ¼ in. | 74 | 54 | 68 | 49 |
| ⅜ in. | 75 | 65 | 69 | 53 |
| ½ in. | 78 | 68 | 72 | 59 |
| ¾ to 1¼ in. | 81 | 72 | 75 | 64 |
| 2 to 3 in. | 82 | 75 | 76 | 65 |
| *Lap Weld.* | | | | |
| 1¼ and 1½ in. | .. | .. | 68 | 61 |
| 2 in. | 79 | 72 | 72 | 63 |
| 2½ to 4 in. | 81 | 74 | 74 | 66 |
| 4½ to 6 in. | 80 | 72 | 73 | 65 |
| 7 to 12 in. | 78 | 68 | 71 | 61 |
| 13 to 15 in. | 55 | .. | 47 | .. |
| *Butt Weld, extra strong, plain ends, card weight.* | | | | |
| ⅛, ¼, ⅜ in. | 70 | 60 | 65 | 55 |
| ½ in. | 75 | 69 | 70 | 63 |
| ¾ to 1¼ in. | 79 | 73 | 74 | 65 |
| 2 to 3 in. | 80 | 74 | 75 | 66 |
| *Lap Weld, extra strong, plain ends, card weight.* | | | | |
| 1½ in. | .. | .. | 66 | 60 |
| 2 in. | 76 | 70 | 71 | 63 |
| 2½ to 4 in. | 78 | 72 | 73 | 66 |
| 4½ to 6 in. | 77 | 71 | 72 | 65 |
| 7 to 8 in. | 70 | 60 | 65 | 55 |
| 9 to 12 in. | 65 | 53 | 60 | 50 |
| *Butt Weld, double extra strong, plain ends, card weight.* | | | | |
| ½ in. | 65 | 59 | 60 | 52 |
| ¾ to 1¼ in. | 68 | 62 | 63 | 55 |
| 2 to 3 in. | 70 | 64 | 65 | 57 |

| *Lap Weld, double extra strong, plain ends, card weight.* | | | | |
|---|---|---|---|---|
| 2 in. | 66 | 60 | 61 | 52 |
| 2½ to 4 in. | 68 | 62 | 63 | 57 |
| 4½ to 6 in. | 67 | 61 | 62 | 56 |
| 7 to 8 in. | 60 | 50 | 55 | 45 |

*Plugged and Reamed.*

| | |
|---|---|
| 1 to 1¼, 2 to 3 in. Butt Weld<br>2, 2½ to 4 in. Lap Weld | Will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld as specified. |

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

**Boiler tubes.**—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

| *Steel.* | | *Standard Charcoal Iron.* | |
|---|---|---|---|
| 1¾ to 2¼ in. | 65 | 1½ in. | 48 |
| 2½ in. | 67½ | 1¾ to 2¼ | 50 |
| 2¾ to 3¼ in. | 72½ | 2½ in. | 55 |
| 3½ to 4 in. | 75 | 2¾ to 5 in. | 60 |
| 5 to 6 in. | 67½ | Locomotive and steamship special grades bring higher prices. | |
| 7 to 13 in. | 65 | | |

2½ in. and smaller, over 18 ft., 10 per cent, net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered, by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f. o. b. mill at Pittburgh basing discount, lowered by two points.

## Pittsburgh

PITTSBURGH, PA., March 20, 1912.

The situation in the steel trade is looking better. Reports of specifications coming in and new business entered are more favorable. The tone of prices is stronger. On Monday the Carnegie Steel Company put its asking price on shapes and plates to 1.20c. and on steel bars to 1.15c., following action taken by several of the other steel companies late last week. On very desirable specifications steel bars are still obtainable at 1.10c. and plates and shapes at 1.15c., but these prices are absolute minimum of the market. The recent heavy purchases of pig iron, steel billets and sheet bars and the high prices being paid for coke, together with the mild weather of the past week, are largely responsible for the present improved condition of the market on finished iron and steel. Stocks of pig iron held by furnaces and at other places have been pretty well bought up and the pig iron market is strong. The consumption of steel by the finishing mills is heavy and it is claimed that the leading interest is short from 50,000 to 100,000 tons of steel per month on its contracts. Producers of steel billets and sheet bars are firmer as to prices, and several are quoting higher figures. A feature of the situation is that the Steel Corporation and other leading steel companies have decided to run their plants to as full capacity as possible in order to obtain minimum costs of production. The car situation is reported a little better, due to the mild weather. The flurry in furnace and foundry coke is on the wane and prices are lower. The scrap market is showing a good deal of strength.

**Pig Iron.**—Reports of purchases of Bessemer iron have been magnified in the daily press. The Republic Iron & Steel Company has bought 10,000 tons of Bessemer iron from the Brier Hill Steel Company at $14 at furnace, but the Carnegie Steel Company has made no purchase in addition to what was mentioned last week. A local interest reports a sale of 2500 tons of Bessemer at $14.25, Valley furnace, and another sale of 1000 tons is reported at the same price. A Youngstown interest reports sales of 5000 tons of basic at $13, 3000 tons at the same price, and some smaller sales, the total aggregating about 10,000 tons. Reports that the Carnegie company had bought basic iron are untrue. A local consumer has bought upward of 5000 tons of No. 2 foundry iron for second half delivery at $13, Valley furnace, but it is doubtful if any more iron could be obtained at this price as all the Valley makers are now quoting $13.25. Small lots of basic can be picked up from dealers at $12.85 to $12.90, Valley furnace, but all the makers are holding firm at $13. We quote: Bessemer iron, $14.25; basic, $12.85 to $13; malleable Bessemer, $13 to $13.25; gray forge, $12.50 to $12.75; No. 2 foundry, $13.25, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

**Steel Billets.**—The billet and rail sales department of the Carnegie Steel Company reports orders sent to the mills for rolling up to and including Monday, show an increase of 30,000 tons over the same period in February. The Jones & Laughlin Steel Company on Monday started up on double turn its 40-in. blooming and sheet bar mill at Aliquippa. Three of the four Talbot open-hearth furnaces are running at Aliquippa but have not yet reached their maximum output, turning out about 200 tons of steel per day each. The consumption of sheet bars and billets at present is very heavy, and most consumers whose contracts expire on March 31 have covered through second quarter and in some cases through third quarter of this year. We quote f.o.b. Pittsburgh: Bessemer billets, 4 x 4 in., 0.25 carbon, at $19.50 to $20; open-hearth billets, $19 to $19.50; Bessemer and open-hearth sheet and tin plate bars, $20 to $21, and forging billets, $28. We quote f.o.b. Youngstown mill: Bessemer and open-hearth billets, $19 to $19.50; Bessemer and open-hearth sheet bars, $20 to $20.50.

**Ferromanganese.**—Delays in deliveries of ferromanganese have created a heavy inquiry for spot delivery, and where a dealer is able to guarantee quick shipment he can obtain a slight premium. One vessel carrying about 2500 tons, due at Baltimore early this month, has not yet reached port owing to broken engines. A sale of about 50 tons is reported by a local dealer at 25c. premium. We quote English 80 per cent. at $41, f.o.b. Baltimore. The freight rate for delivery in the Pittsburgh district is $1.95 a ton.

**Ferrosilicon.**—There is a fair amount of inquiry for prompt shipment. We note a sale of 100 tons of 50 per cent. for delivery over four months, commencing April, at $69, delivered at buyer's mill. We quote 50 per cent. in lots up to 100 tons at $70; over 100 tons to 600 tons, $69, and over 600 tons, $68, Pittsburgh. The lower grades are ruling at about $20 for 10 per cent.; $21 for 11 per cent.; $22 for 12 per cent., f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio.

**Muck Bar.**—New inquiry is reported a little better and a sale of about 500 tons for April and May delivery has been made at about $28. We quote best grades of muck bar, made from all pig iron, at $28, delivered Pittsburgh.

**Wire Rods.**—Consumers being well covered by contracts, new sales are confined to small lots for prompt delivery. We quote Bessemer, open-hearth and chain rods at $25, Pittsburgh.

**Skelp.**—More inquiries are out than for some time. A skelp mill outside the city is reported to have sold 5000 tons of sheared steel at about 1.15c. at mill. The Carnegie Steel Company has started up a skelp mill in its Sharon works which can turn out about 10,000 tons per month. We quote grooved steel skelp at 1.10c. to 1.12½c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.40c. to 1.45c., and sheared iron skelp, 1.55c. to 1.60c., all for delivery at buyer's mill in the Pittsburgh district.

**Steel Rails.**—The threatened coal strike on April 1 is interfering to some extent with the demand for light rails from coal companies that expect to be affected. This is offset to some extent by an increased demand from companies that run non-union and which in some cases have started up coal mines that had been closed down for some time. The Carnegie Steel Company is receiving some good orders for standard sections and also for light rails for export. Prices on light rails are firm and are expected to be higher shortly. We quote splice bars at 1.50c. per lb., and repeat quotations on rails: Standard sections, 1.25c. per lb.; 8 and 10-lb. light rails, 1.25c.; 12 and 14-lb., 1.16c.; 16, 20 and 25-lb., 1.12c.; 30 and 35-lb., 1.10c., and 40 and 45-lb., 1.08c., f.o.b. at mill.

**Structural Material**—While a fair amount of new work is being placed, complaints are made that contracts for fabricated material are being placed at prices that leave very little, if any, margin of profit. The American Bridge Company has taken 3000 tons of bridge work for a Western railroad and 2000 tons of steel for an office building in the West. The McClintic-Marshall Construction Company has taken 1200 tons for a power station at Keokuk, Iowa, and 1300 tons for a power house for the Hydraulic Engineering Company of Maine. Active work on the new Monongahela Hotel in this city is scheduled to start May 1, and the contract for the steel, 6000 to 7000 tons, will likely be placed in the mean time. The Riter-Conley Mfg. Company has taken a contract for 1350 galvanized steel transmission towers for the Ebro Irrigation & Power Company, Barcelona, Spain. The contract includes about 3500 tons of angles, shapes and other material and amounts to about $250,000. The Carnegie Steel Company announces that its asking price on shapes is now 1.20c. Very desirable specifications can still be placed at 1.15c., this being absolute minimum of the market.

**Plates.**—The leading steel car transaction of the week was that of the Western Maryland Railroad,

which bought 500 steel gondolas and 500 steel hoppers of the Pressed Steel Car Company, the same number of the Standard Steel Car Company and 500 steel underframe box cars of the American Car & Foundry Company. The Wabash is still in the market for 1000 steel underframe stock cars, 1000 box cars, 750 automobile cars, 200 all-steel hopper cars and 24 passenger coaches. The Rock Island is reported to have placed 700 steel underframe cars with the Standard Steel Car Company. The Cambria Steel Company, Johnstown, Pa., has taken a contract for 1500 built-up frames for Alco motor trucks for commercial uses. It is reported that the Baltimore & Ohio has placed, or is about to place, a contract for changing about 10,000 wooden underframe box cars to steel underframe. The American Shipbuilding Company, Toledo, Ohio, has taken a contract for a passenger boat requiring about 3100 tons of plates and shapes which will be furnished by the Carnegie Steel Company. The Fore River Shipbuilding Company has taken contracts for two boats and the Harlan & Holingsworth Company for one boat, the material for which, about 5000 tons of plates and shapes, will be rolled by the Carnegie Company. Prices on plates are firmer, several of the larger mills now quoting 1.20c. at mill. We quote ¼ in. and heavier plates at 1.15c. to 1.20c., f.o.b. mill, Pittsburgh.

**Sheets.**—New buying is reported heavier. Specifications against contracts also continue to come in in large volume. The condition of the sheet trade from standpoint of tonnage is therefore very satisfactory, but less so as regards prices. The sheet mills in the Pittsburgh district are well filled up to July 1, and in some cases have a fair business booked for delivery in third quarter. The American Sheet & Tin Plate Company is operating to 92 per cent. of hot sheet mill capacity, and leading independent mills are running at about the same rate. Liberal orders are coming in for roofing sheets. The tone of the market is firmer, and 1.80c. on No. 28 black sheets and 2.80 c. on No. 28 galvanized, f. o. b. maker's mill, in carload and larger lots, seem to be minimum of the market.

**Tin Plate.**—Specifications against contracts are very heavy, and shipments this month promise to break all records. The car supply is better, due to the milder weather, and in a short time will probably be ample. Some of the tin plate mills report they are having trouble in getting deliveries of tin bars as fast as needed. The American Sheet & Tin Plate Company is running to 94 per cent. of its hot tin mill capacity, and most of the leading independent mills are operating practically full. Prices are a little firmer. We quote 14 x 20 coke plates at $3.30 to $3.40 per base box.

**Iron and Steel Bars.**—New buying is reported to be slightly more active and specifications against contracts for steel bars have been coming in at a better rate, probably due to the milder weather. The leading steel bar mills are pretty well filled up on contracts through second quarter, and the tone of the market is stronger. Two leading makers are now quoting 1.15c. on new business, but on desirable orders 1.10c. is still being done. The demand for iron bars is quiet and mostly for small lots. We quote steel bars at 1.10c. to 1.15c. and iron bars at 1.25c., maker's mill, Pittsburgh.

**Hoops and Bands.**—The demand for both hoops and bands is reported as picking up and specifications are coming in more freely. In sympathy with other lines of finished products, prices are firmer. We quote bands at 1.10c., with extras as per the steel bar card, and hoops at 1.25c., these prices being referred to as minimum of the market.

**Rivets.**—The new demand for both structural and boiler rivets is heavier, and specifications are more active. We continue to quote structural rivets at 1.45c. to 1.50c. and boiler rivets at 1.55c. to 1.60c., prices depending on the size of the order and deliveries wanted by the customer.

**Shafting.**—The demand is stronger. A local maker reports receiving specifications in one day recently for 600 tons, the heaviest business placed in one day for a long time. Prices have not as yet shown any improvement. We quote cold rolled shafting at 57 per cent. off in carloads and 62 per cent. off in less than carloads delivered in base territory.

**Merchant Steel.**—Specifications from implement makers are coming in at a better rate, and the new demand is also better, especially for spring and machinery steels. One mill reports that its shipments so far this month are very much in excess of any similar period for some time. Prices are reported to be stronger. We quote: Iron finished tire, 1½ x ¾-in. and larger, 1.15c., base; planished tire, ⅛-in. and larger, 1.35c.; channel tire, ¾, ⅞ and 1-in., 1.65c.; toe calk, 1.70c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.55c.; cutter shoe tapered or bent, 2.15c.; spring steel, 1.75c.; machinery steel, smooth finish, 1.50c., all f. o. b. at mill.

**Railroad Spikes.**—The heavy specifications for railroad spikes placed in the past two weeks, together with a slightly better new demand, have firmed up prices and some makers are now quoting standard sizes at $1.40 per 100 lb. We quote at $1.35 to $1.40 for base sizes, the lower price being absolutely minimum on large lots.

**Spelter.**—The market has gone off, due to a heavier supply, and we quote prime grades of Western at 6.82½c. Pittsburgh. The consumption continues heavy and deliveries by the railroads to consumers are unsatisfactory.

**Wire Products.**—The new demand for wire and wire nails is only fair and usually for small lots, most consumers having covered requirements some time ago. Specifications against such contracts have not been coming in well, and the general condition of the wire nail trade is not up to expectations. It is said that regular prices are being well maintained. We quote wire nails at $1.60; cut nails, $1.50; galvanized barb wire, $1.90; painted, $1.60; annealed fence wire, $1.40, and galvanized fence wire, $1.70, f. o. b. Pittsburgh, usual terms, freight added to point of delivery.

**Merchant Pipe.**—The Philadelphia Company of this city has inquiries out for 30 miles of 16-in. line pipe, 20 miles of 12-in. and 20 miles of 10-in., to meet its estimated extensions to gas lines this year, the pipe being for spring delivery. The inquiry of the Ohio Fuel Supply Company for 50 to 65 miles of 12-in. line pipe has not yet been closed. The city of Huntington, W. Va., is in the market for 22 miles of 10-in. steel line pipe for a natural gas line. Several leading mills report that orders for merchant and line pipe booked so far this month show a heavy increase over the same period in February. The report that the National Tube Company had advanced prices on black and galvanized steel pipe is untrue. The only advance made was on galvanized iron pipe, which went into effect March 1.

**Boiler Tubes.**—Railroads are specifying actively against contracts for locomotive tubes placed several months ago at very low prices. New buying is quiet, and there is not much doing in merchant tubes, prices on the latter still being materially shaded.

**Iron and Steel Scrap.**—It is now given out that the total purchases of heavy steel scrap by the Carnegie Steel Company for delivery at Munhall and Sharon amounted to only 8000 tons. It is stated, but not officially confirmed, that the company will buy more, provided dealers are willing to sell at the same price, which was $13, delivered. The supply of heavy steel scrap is limited, and there are said to be heavy shortages which efforts are being made to cover. The scrap list of the Baltimore & Ohio Railroad closed last week, and as several dealers who quoted $13 on the heavy steel scrap failed to get any of it the assumption is that it went at a higher price. The consumption of scrap in this city and in the Youngstown district promises to increase materially within the next year. The Brier Hill Steel Company and the Youngstown Sheet & Tube Company will be heavy buyers when the new steel plants they now have under way are finished. Prices are firmer and we have advanced quotations on heavy steel scrap, borings and turnings. Dealers are now quoting as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

| | |
|---|---|
| Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery | $13.00 |
| No. 1 foundry cast | $12.25 to 12.50 |
| No. 2 foundry cast | 10.25 to 10.50 |
| Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district | 11.00 to 11.25 |
| Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. | 12.75 to 13.00 |
| No. 1 railroad malleable stock | 11.25 to 11.50 |
| Grate bars | 9.00 to 9.25 |
| Low phosphorus melting stock | 15.00 to 15.25 |
| Iron car axles | 20.50 to 21.00 |
| Steel car axles | 16.00 to 16.25 |
| Locomotive axle | 22.00 to 22.50 |
| No. 1 busheling scrap | 11.00 to 11.25 |
| No. 2 busheling scrap | 7.00 to 7.25 |
| Old car wheels | 12.00 to 12.25 |
| *Cast iron borings | 9.25 to 9.50 |
| *Machine shop turnings | 9.75 to 10.00 |
| †Sheet bar crop ends | 13.75 to 14.00 |
| Old iron rails | 14.50 to 14.75 |
| No. 1 wrought scrap | 12.50 to 12.75 |
| Heavy steel axle turnings | 9.75 to 10.00 |
| Stove plate | 9.00 to 9.25 |

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

**Coke.**—The flurry in the coke market seems to be quieting down, and both furnace and foundry coke for prompt shipment can be had to-day at lower prices than were ruling a week ago. Several sales of standard grade furnace coke were made this week at $2.15 per net ton at oven, while standard makes of 72-hr. foundry coke are held at $2.50 to $2.75 at oven. An Eastern steel company is reported to have closed for a large tonnage of furnace coke for delivery over the last six months of this year at $2 per ton at oven, but the report has not been confirmed. We quote standard makes of prompt furnace coke at $2.15 and 72-hr. foundry at $2.50 to $2.75 per net ton at oven. The output in the upper and lower Connellsville regions last week was 398,715 net tons, an increase over the previous week of about 3000 tons.

## Chicago

CHICAGO, ILL., March 19, 1912.

The past week found the recently improved feeling emphasized by a continuance of heavy specifications and satisfactory inquiry. In local pig iron circles inquiries call for an aggregate of not less than 15,000 tons, including foundry, basic and malleable iron, as well as a liberal demand for charcoal iron. Some of the Western railroads are asking that deliveries on rails be anticipated, and one road which recently purchased 20,000 tons has increased its order to 35,000 tons. Specifications for plates, structural shapes, and bars continue heavy, and business shows marked indications of becoming more general in character. While still considerably behind in deliveries, some of the local mills have improved their condition and are now doing better than a fortnight ago. The increased strength in prices is indicated particularly by advances asked on the less desirable business and by an increasing willingness to forfeit this business except at the advance. Contracts for fabricated steel aggregating about 9000 tons are reported. The old material market continues decidedly firm. The coal and coke situation is commanding the attention of practically all branches of industry, the former because of the apparently inevitable strike which seems imminent and the latter because of a scarcity due to the prevailing railroad conditions.

**Pig Iron.**—A canvass among pig iron melters in this territory has brought out a very decided interest in third quarter delivery and a number of inquiries for foundry iron for this shipment are noted. Prospective purchases of charcoal iron, which are expected to be placed here, aggregate nearly 7000 tons. A local melter of basic iron who has been out of the market for several months is again inquiring for 2000 tons. A sale of 1000 tons of Southern iron is noted, and also an inquiry for a like amount to be shipped largely in the first half. Southern furnaces show no signs of departing from their established position on the basis of $10.50 for No. 2 at Birmingham while for local iron there is perhaps a more consistent adherence to the price of $14 at furnace. A better tone of the local market is as much due, however, to a sentiment reflected from sales in other territory as from local activity. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

| | |
|---|---|
| Lake Superior charcoal | $15.75 to $16.50 |
| Northern coke foundry, No. 1 | 14.50 |
| Northern coke foundry, No. 2 | 14.00 |
| Northern coke foundry, No. 3 | 13.50 to 14.00 |
| Northern Scotch, No. 1 | 16.00 |
| Southern coke, No. 1 foundry and No. 1 soft | 15.35 |
| Southern coke, No. 2 foundry and No. 2 soft | 14.85 |
| Southern coke, No. 3 | 14.35 |
| Southern coke, No. 4 | 14.10 |
| Southern gray forge | 13.85 |
| Southern mottled | 13.85 |
| Malleable Bessemer | 14.00 |
| Standard Bessemer | 16.75 |
| Basic | 14.75 |
| Jackson County and Kentucky silvery, 6 per cent | 16.40 |
| Jackson County and Kentucky silvery, 8 per cent | 17.40 |
| Jackson County and Kentucky silvery, 10 per cent | 18.40 |

**Rails and Track Supplies.**—The Wabash Railroad has increased its purchase of rails from 20,000 to 35,000 tons. Other Western railroads are attempting to obtain earlier deliveries than originally named on their orders. Specifications covering track supplies are increasingly heavy and prices have advanced from minimum quotations $1 to $2 per ton. We quote standard railroad spikes at 1.50c., base; track bolts, with square nuts, 1.90c., base, all in carload lots, Chicago; standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c.; angle bars, 1.50c., Chicago.

**Structural Material.**—Contracts for fabricated material placed the past week total about 9000 tons, the largest item of which is an order for 3000 tons for Chicago, St. Paul, Minneapolis & Omaha Railway bridges. The American Bridge Company will furnish the steel for the new Lincoln building, Chicago, amounting to 2000 tons. The Worden-Allen Company will fabricate 412 tons for the Janesville Machine Company, Janesville, Wis. For the power station at Keokuk, Iowa, the McClintic-Marshall Construction Company will supply 1275 tons. Additional orders taken by the American Bridge Company include 992 tons for a building for the Minnesota Steel Company at Duluth, and 400 tons of truss spans for the Midland Bridge Company. The contract for the Webster building recently awarded to A. Bolter's Sons has been reawarded to the Noelke-Richards Iron Works, Indianapolis. Car purchases the past week include 700 by the Rock Island and 300 by the Wabash, all of which will be built at the Hammond plant of the Standard Steel Car Company. Some improvement in deliveries of structural shapes from local mills is noted. We quote for Chicago delivery, mill shipment, 1.28c. to 1.38c., and from store 1.60c.

**Plates.**—The situation has not changed materially except for the general firming up of prices. It is also noted that orders are of a more general character than has hitherto been the case. Plate requirements demanding prompt shipment are being placed of necessity with Eastern mills and generally at higher prices than are quoted locally. The output of local mills is well up to capacity and it is reported that specifications on contract are keeping pace with mill operations. For Chicago delivery we quote mill shipment 1.28c. to 1.38c. and from store 1.60c.

**Sheets.**—Quotations as low as 2.98c. for No. 28 galvanized, at Chicago, are still encountered, but local mill quotations are based on a minimum of 3.03c. for the most desirable business, with other orders acceptable only at prices $1 a ton higher. The volume of sheet business continues very satisfactory. We quote Chicago prices as follows: Carload lots, from mill, No. 28 black sheets, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.; No. 10 blue annealed, 1.53c. to 1.58c. Prices from store, Chicago, are: No. 10, 1.90c.; No. 12, 1.95c.; No. 28 black, 2.30c.; No. 28 galvanized, 3.35c.

**Bars.**—While all of the bar iron mills in this territory do not seem to be equally favored in the matter of tonnage, the general run of orders shows an improved condition. The Interstate Iron & Steel Company is operating its East Chicago mill practically to capacity. New orders for steel bars are not heavy at this season, but specifications continue undiminished in tonnage. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.25c. to 1.33c.; bar iron, 1.15c. to 1.20c.; hard steel bars, rolled from old rails, 1.15c. to 1.20c. From store: Soft steel bars, 1.50c. to 1.55c., Chicago.

**Wire Products.**—Spring buying has been retarded by the rigorous weather conditions and shipments have been materially curtailed. We continue to quote as follows: Plain wire, No. 9 and coarser, base, $1.58; wire nails, $1.78; painted barb wire, $1.78 to $1.83; galvanized, $2.08; polished staples, $1.83; galvanized, $2.13, all Chicago.

**Cast Iron Pipe.**—A contract for 1600 tons of 30-in. pipe was awarded to the United States Cast Iron Pipe & Foundry Company by the city of Seattle and the same company will furnish about 2200 tons for Kansas City. A fair volume of small contracts has developed, and small orders from almost all of the Western railroads have been received within the past 10 days. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $27; 6 to 12-in., $25; 16-in. and up, $24.50, with $1 extra for gas pipe.

**Old Material.**—Traffic and weather conditions continue to restrict trading in scrap in this market within very narrow limits, and a situation particularly unsatisfactory to buyers prevails. Melters state that despite heavy purchases they are receiving scarcely enough to meet their current needs, and in some instances their stocks have run so low as to make their demands insistent. While this situation has served to create a decided firmness in the market, too little material is available to permit of enough trading to bring about decided advances in price. Railroad offerings this week are limited to 1500 tons by the Northern Pacific, closing Thursday, and 600 tons by the Eastern Illinois, closing Wednesday. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

*Per Gross Ton.*

| | |
|---|---|
| Old iron rails | $15.00 to $15.50 |
| Old steel rails, rerolling | 12.50 to 13.00 |
| Old steel rails, less than 3 ft | 11.75 to 12.25 |
| Relaying rails, standard section, subject to inspection | 24.00 |
| Old car wheels | 13.00 to 13.50 |
| Heavy melting steel scrap | 10.75 to 11.25 |
| Frogs, switches and guards, cut apart | 11.00 to 11.50 |
| Shoveling steel | 10.25 to 10.75 |
| Steel axle turnings | 8.50 to 9.00 |

*Per Net Ton.*

| | |
|---|---|
| Iron angles and splice bars | $12.75 to $13.25 |
| Iron arch bars and transoms | 13.75 to 14.25 |
| Steel angle bars | 10.50 to 11.00 |
| Iron car axles | 18.25 to 18.75 |
| Steel car axles | 15.50 to 16.00 |
| No. 1 railroad wrought | 11.25 to 11.75 |
| No. 2 railroad wrought | 10.25 to 10.75 |
| Steel knuckles and couplers | 10.50 to 11.00 |
| Steel springs | 10.50 to 11.00 |
| Locomotive tires, smooth | 12.75 to 13.25 |
| Machine shop turnings | 6.75 to 7.25 |
| Cast and mixed borings | 6.25 to 6.75 |
| No. 1 busheling | 9.25 to 9.75 |
| No. 2 busheling | 6.25 to 6.75 |
| No. 1 boilers, cut to sheets and rings | 7.00 to 7.50 |
| Boiler punchings | 12.50 to 13.00 |
| No. 1 cast scrap | 11.00 to 11.50 |
| Stove plate and light cast scrap | 9.25 to 9.75 |
| Railroad malleable | 10.50 to 11.00 |
| Agricultural malleable | 9.50 to 10.00 |
| Pipes and flues | 8.25 to 8.75 |

## Philadelphia

PHILADELPHIA, PA., March 19, 1912.

Iron and steel makers are decidedly firmer as to prices. The recent low level for foundry pig iron, as well as for some classes of finished products, has practically disappeared. Plate mills are receiving a much larger volume of business and have been operating on a somewhat better basis. Coal and coke for prompt shipment are in sharp demand, with the supply small and prices advancing. Billets continue in active request. The old material market is firmer.

**Iron Ore.**—The market is bare of any fresh inquiry. Importations during the week include 11,700 tons of Cuban and 11,046 tons of Swedish ore.

**Pig Iron.**—The somewhat better demand for foundry grades, the urgent requests for delivery on contracts and the uncertainty as to the possibility of a coal miners' strike have resulted in a decided firming up in this district. In addition to these factors the strength of the Southern situation and the withdrawal of the leading Virginia interest from the market have had a stiffening effect. Standard brands of eastern Pennsylvania No. 2 X foundry are now held at $15, delivered, as a minimum, and sales have been more freely made at $15.25. Considerable inquiry for second quarter has developed, but sellers are not disposed to contract extensively for such shipment. Stocks are declining on urgent calls for shipments on contracts. The Virginia Iron, Coal & Coke Company has withdrawn all outstanding quotations and now asks 50c. to $1 a ton more. Another Virginia maker has sold heavily for New England and Western shipment, also for delivery in this district at $12.50 at furnace, equal to $15.30 to $15.50, delivered in this vicinity. A number of the sales were 500-ton lots for second quarter. Cast iron pipe makers are still looking round for low grade iron, but have only bought odd lots. Prices of such iron are very firm, as the supply is rather meagre. Some quiet inquiry for forge iron has been made by rolling mills, but no business has developed. Steel making irons show little movement. Small sales of low phosphorus iron have been made, but some makers quote prohibitive prices against recent inquiries for forward iron. The demand for basic is practically at a standstill, but in view of the general firmness of the market makers talk higher prices. Quotations for standard brands, delivered in buyers' yards in this district, range about as follows:

| | |
|---|---|
| Eastern Pennsylvania No. 2 X foundry | $15.00 to $15.25 |
| Eastern Pennsylvania No. 2 plain | 14.75 to 15.00 |
| Virginia foundry | 15.30 to 15.50 |
| Gray forge | 14.25 |
| Basic | 14.50 |
| Standard low phosphorus | 19.00 to 19.25 |

**Ferroalloys.**—There has been more inquiry for small prompt lots of ferromanganese, with but little movement, as practically all sellers are out of the market. Consumers have offered as high as $42.50, Baltimore, for 80 per cent. and higher prices could no doubt be obtained if a supply were available. Broken lots, composed of a few tons, have sold as high as $55, delivered. There has been no movement in ferrosilicon and prices are unchanged.

**Billets.**—A continued fair demand is reported, Eastern mills readily obtaining $22.40 to $23.40, delivered here, for moderate lots of rolling billets, while forging billets are moving at $26.40 to $27.40, delivered, according to specification. Foreign inquiries before the trade have been largely held in abeyance by the mills abroad, owing to fuel shortages.

**Plates.**—There is a stronger adherence to the 1.30c., delivered, basis for ordinary plates as a minimum price, and for small lots 1.35c., is more easily obtained. A much better volume of business is coming out and consumers are making efforts to renew contracts expiring with the end of the month, but meet with little success. Larger specifications for locomotive, bridge and ship plates are coming to the mills. In instances orders for 1000 and 1500-ton lots have been placed with Eastern mills.

**Structural Material.**—A better run of orders for miscellaneous material has been coming out, and mills are readily obtaining 1.35c. for odd lots of plain shapes and are holding quite firmly at 1.30c., delivered, for general business. No important contracts for buildings or bridges have come out during the week.

**Sheets.**—Eastern mills continue to receive orders, which while individually small, aggregate a volume in excess of current production. Mills are running full time and orders are accumulating. Urgent delivery is being pretty generally requested. While 1.95c. to 2c., delivered, is named for Western No. 28 sheets, Eastern mills making smooth, loose-rolled sheets readily obtain ¼ to ½c. advance over the outside quotations.

**Bars.**—The demand remains quiet. Small sales of iron bars continue to be made at 1.22½c., delivered here, as a minimum, although some makers name 1.27½c. as a minimum. Specifications for steel bars are reported as coming in freely, but new business is light.

**Coke.**—The demand for prompt coke is still active, but the supply appears to be smaller. Some makers have practically withdrawn from the market and prices as high as $2.75 to $3 at oven have been asked for prompt foundry coke, although $2.60 to $2.90 represents the general market. Furnace coke is quoted as high as $2.25 to $2.35 at oven for prompt shipment, but consumers do not come into the market at those prices. The general range of the market shows little change, but quotations are largely nominal, the following, per net ton, being named for deliveries in this territory:

| | |
|---|---|
| Connellsville furnace coke | $4.10 to $4.35 |
| Foundry coke | 4.60 to 5.00 |
| Mountain furnace coke | 3.70 to 3.95 |
| Foundry coke | 4.20 to 4.60 |

**Old Material.**—While there has been little movement, the market is sentimentally stronger. Few large purchases of heavy melting steel are noted and prices are unchanged. More inquiry for rolling mill grades of scrap is reported, but the volume of business transacted is small. The following range of prices about represents quotations at which ordinary current business for prompt shipment can be done for delivery in buyers' yards, eastern Pennsylvania and nearby points taking a freight rate from Philadelphia varying from 35c. to $1.35 per gross ton, for shipment ranging from prompt to the remainder of the year:

| | |
|---|---|
| No. 1 heavy melting steel scrap and crops | $11.75 to $12.00 |
| Old steel rails, rerolling (nominal) | 13.75 to 14.00 |
| Low phosphorus heavy melting steel scrap | 15.25 to 15.75 |
| Old steel axles | 17.00 to 17.50 |
| Old iron axles (nominal) | 22.00 to 23.00 |
| Old iron rails (nominal) | 15.50 to 16.00 |
| Old car wheels | 11.75 to 12.25 |
| No. 1 railroad wrought | 14.00 to 14.50 |
| Wrought iron pipe | 11.75 to 12.25 |
| No. 1 forge fire | 9.75 to 10.25 |
| No. 2 light iron (nominal) | 6.75 to 7.25 |
| Wrought turnings | 8.75 to 9.25 |
| Cast borings | 8.50 to 9.00 |
| Machinery cast | 13.25 to 13.75 |
| Railroad malleable (nominal) | 11.75 to 12.25 |
| Grate bars, railroad | 10.00 to 10.50 |
| Stove plate | 9.50 to 10.00 |

## Cleveland

CLEVELAND, OHIO, March 19, 1912.

**Iron Ore.**—An Ohio furnace interest has an inquiry out for 25,000 tons of non-Bessemer ore. This has been given to several ore firms and it is believed that it may result in quotations that will establish the season's market prices. While no other inquiries are openly reported it is believed some market activity will be seen before the end of the week. Late last week Corrigan, McKinney & Co., Cleveland, asked vessel men for rates for carrying 1,000,000 tons of ore. This firm announces that on Monday it closed vessel contracts for moving about that tonnage at 55 cents a ton from ports at the head of Lake Superior to Lake Erie,

based on an unloading charge of 15 cents a ton. A reduction from the 55-cent rate is to be made to correspond with whatever reduction is made in the unloading charge, so that vessel men will get a net rate of 40 cents a ton, or 5 cents less than last year. Managers of a number of important vessel interests say that they will not take tonnage at this rate. Some declare that they will allow their boats to remain idle rather than accept the reduced rate. With an increase over last year's ore shipments they look for large improvement in the lake trade this season and believe that last season's carrying charges should be maintained. Corrigan, McKinney & Co. state that the vessel tonnage contracted for is to carry ore for their own blast furnaces and to fill orders on long time contracts made previous to the present season. We quote nominal prices—those of last year—as follows: Old range Bessemer, $4.50; Mesaba Bessemer, $4.25; old range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

**Pig Iron.**—The demand for foundry iron has become quite active. A number of lots ranging from 300 to 500 tons were sold in northern Ohio in the week and there is a good volume of inquiry. While sales were mostly for the second quarter delivery some iron was sold for shipment into the third quarter at current prices. The market is firmer on foundry grades. Some consumers want to buy for the third quarter delivery but several sellers are not disposed to take orders for delivery beyond July 1 and are unwilling to quote current prices for extended delivery. There is also considerable inquiry for other grades of iron from the Central West. The United Steel Company, Canton, Ohio, has bought 3000 tons of basic iron for April delivery from a near-by furnace having a 50-cent freight rate, at about $12.80, Valley furnace. A western Ohio consumer is in the market for 1500 tons of basic. Cleveland furnaces are quoting No. 2 foundry at $13 and this price can probably be shaded for outside shipments but sales by Valley furnaces are generally being made at $13.25 for No. 2. We quote the following prices for prompt shipment and for the second quarter, delivered, Cleveland:

| | |
|---|---|
| Bessemer | $14.15 |
| Basic | 13.25 |
| Northern foundry No. 2 | 13.25 |
| Southern foundry No. 2 | $14.60 to 14.85 |
| Gray forge | 12.50 |
| Jackson silvery, 8 per cent. silicon | 17.05 |

**Coke.**—A western New York steel interest is in the market for about 15,000 tons of furnace coke a month for three months. There is a good demand for foundry grades for spot shipment. Because of the danger of a shortage should a coal miners' strike go into effect some consumers already under contract are paying advanced prices for additional coke in order to stock up. Furnace coke is quoted at $2.25 per net ton at oven. Connellsville 72-hr. foundry coke is quoted at $2.75 to $3. Sales are being made at the lower price.

**Finished Iron and Steel.**—The demand for nearly all lines shows an improvement and the market has a much firmer tone. Advances in prices have been quite general. One leading independent selling agency reports that its business during the past week, both in the orders and aggregate tonnage, was the largest since September, and other sellers note decided improvement in both specifications and current orders. A leading interest has advanced its minimum price to 1.15c. on soft steel bars and to 1.20c. on plates and shapes. Other selling agencies are holding to these prices for small lots, but are still quoting steel bars at 1.10c. and plates and structural material at 1.15c. for round tonnage. A local producer has advanced its price on plates to 1.20c. Some short time contracts are being placed and inquiries are coming out for third quarter contracts. The mills generally do not care to quote for delivery beyond July 1. The improved demand for structural material has resulted in some of the mills being unable to make delivery within about four weeks. Considerable structural inquiry is coming out for small tonnage. Hard steel bars are still selling at a minimum of 1.05c., but an advance is expected. With the approach of spring the demand for steel bars for concrete reinforcing work has improved. The demand for sheets is somewhat more active and prices are firmer, although the recent low quotations of 1.80c. for No. 28 black and 2.80c. for No. 28 galvanized have not disappeared. The demand for iron bars is more active than for some time and prices are unchanged. We quote iron bars at 1.20c., Cleveland mill.

**Old Material.**—The market shows a little more activity. This is largely due to recent buying by steel companies in the Pittsburgh and Valley districts. Some inquiries, mostly for heavy steel scrap, have come from those districts from dealers who sold short and now want to cover. Dealers are offering for small lots slightly more than the mills are willing to pay. The local demand is light. Consumers refuse to pay over $11.50 for heavy steel. Dealers have bought some small lots at $11.25. Turnings, which are somewhat scarce, and borings have advanced 25c. a ton. Other prices are unchanged. Dealers' prices, f.o.b. Cleveland, are as follows:

*Per Gross Ton.*

| | |
|---|---|
| Old steel rails, rerolling | $12.25 to $12.75 |
| Old iron rails | 14.00 to 14.50 |
| Steel car axles | 17.50 to 18.00 |
| Heavy melting steel | 11.25 to 11.75 |
| Old car wheels | 12.00 to 12.50 |
| Relaying rails, 50 lb. and over | 22.50 to 23.50 |
| Agricultural malleable | 10.50 to 11.00 |
| Railroad malleable | 11.50 to 12.00 |
| Light bundled sheet scrap | 9.50 to 10.00 |

*Per Net Ton.*

| | |
|---|---|
| Iron car axles | $18.50 to $19.00 |
| Cast borings | 6.75 to 7.00 |
| Iron and steel turnings and drillings | 7.25 to 7.50 |
| Steel axle turnings | 7.75 to 8.00 |
| No. 1 busheling | 9.50 to 10.00 |
| No. 1 railroad wrought | 11.00 to 11.25 |
| No. 1 cast | 11.25 to 11.75 |
| Stove plate | 9.00 to 9.25 |
| Bundled tin scrap | 11.00 to 11.50 |

## Cincinnati

CINCINNATI, OHIO, March 20, 1912.—*(By Telegraph.)*

**Pig Iron.**—It is reported that a total of about 20,000 tons of Northern basic has been purchased by interests in this vicinity in the past few days. Northern foundry has also been in better demand, and several sales covering lots of 500 to 1000 tons have been made to central and southern Ohio melters. As a consequence Northern producers now see an opportunity to advance prices, and $13.50, Ironton, is minimum for either prompt or first half shipment, although it is possible to contract at this figure for any delivery this year. The uncertainty as to the future cost of coke also tends to hold up the price of Northern iron. Malleable is not in demand, but is quotable at $13.50, Ironton. Since the advance in Northern iron Southern producers are holding prices firmer, and with many of them $10.50, Birmingham, is minimum; but at this figure it is possible to buy for third quarter shipment or to extend contract deliveries throughout the entire year. However, books have not yet been formally opened for second half business. For prompt shipment $10.25, Birmingham basis, can be done, and a few producers outside the Alabama district proper would doubtless accept offers as low as $10 at furnace. While Southern iron was slow last week a local agency sold 1000 tons of No. 3 foundry at $10, Birmingham, to be moved before August 1. A Michigan melter bought 300 tons of No. 2 foundry at $10.50, shipments to extend from March to December. Inquiries include 1000 to 2000 tons of charcoal iron for a Michigan consumer and a number of medium sized lots of both Northern and Southern foundry grades. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows, for prompt shipment:

| | |
|---|---|
| Southern coke, No. 1 foundry and 1 soft | $14.00 to $14.50 |
| Southern coke, No. 2 foundry and 2 soft | 13.50 to 14.00 |
| Southern coke, No. 3 foundry | 13.00 to 13.50 |
| Southern coke, No. 4 foundry | 12.75 to 13.25 |
| Southern gray forge | 12.75 to 13.25 |
| Ohio silvery, 8 per cent. silicon | 16.45 to 16.95 |
| Lake Superior coke, No. 1 | 14.95 to 15.20 |
| Lake Superior coke, No. 2 | 14.70 to 14.95 |
| Lake Superior coke, No. 3 | 14.20 to 14.45 |
| Basic, Northern | 14.70 to 14.95 |
| Standard Southern car wheel | 25.25 to 25.50 |
| Lake Superior car wheel | 19.00 |

*(By Mail.)*

**Coke.**—It is difficult to obtain any definite quotations on spot shipment coke. Where the material is loaded on cars ready for immediate shipment almost any price may be obtained from customers who are short of a supply for nearby requirements. Connellsville furnace brands have been sold within the past few days all the way from $2.15 to $2.65 per net ton at oven, and 72-hr. coke has brought as high as $3.25, but $3 at oven more nearly represents the average price obtained for the latter. The same conditions exist in the Pocahontas field, but in the Wise County district it is reported that these quotations might be shaded from 25c. to 50c. per net ton, in spite of the fact that one of the larger producers in that territory has withdrawn from the market. Cars are very scarce, and many consumers are making bitter complaints as to delays experienced.

**Finished Material.**—There is considerably more ac-

tivity in both steel bars and structural material, and prices have stiffened. One local mill agency is able to book business at 1.15c., Pittsburgh basis, for steel bars, and is holding structural material at 1.20c., at mill. Sheets are in fair demand and the local mill is booking business steadily at the advance in prices recently announced. The local warehouse quotation on steel bars is 1.60c. and on structural material 1.70c.

**Old Material.**—The market is much more active. The steel mills are reported as being better customers, and the foundries are also showing more interest in the situation. Small advances are reported on several different kinds of scrap material. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations the selling prices f.o.b. at yards:

*Per Gross Ton.*

| | | |
|---|---|---|
| Bundled sheet scrap | $7.50 to | $8.00 |
| Old iron rails | 12.25 to | 13.00 |
| Relaying rails, 50 lb. and up | 20.00 to | 21.00 |
| Rerolling steel rails | 11.00 to | 11.50 |
| Melting steel rails | 9.00 to | 9.50 |
| Heavy melting steel scrap | 9.25 to | 9.75 |
| Old car wheels | 11.25 to | 11.75 |

*Per Net Ton.*

| | | |
|---|---|---|
| No. 1 railroad wrought | $9.75 to | $10.25 |
| Cast borings | 5.50 to | 6.00 |
| Steel turnings | 5.75 to | 6.25 |
| No. 1 cast scrap | 10.00 to | 10.50 |
| Burnt scrap | 6.50 to | 7.00 |
| Old iron axles | 15.75 to | 16.25 |
| Locomotive tires (smooth inside) | 11.25 to | 11.75 |
| Pipes and flues | 7.00 to | 7.50 |
| Malleable scrap | 7.50 to | 8.00 |

## Birmingham

BIRMINGHAM, ALA., March 18, 1912.

**Pig Iron.**—The fact that stocks were materially reduced in February and still further reduced in the first 15 days of March has a tendency to put Birmingham sellers of pig iron practically out of the market. There have been a large number of inquiries for 100 to 500 tons, to be shipped in the second and third quarters, but few of these inquiries have been closed, principally for the reason that sellers hesitate to take on more business with the situation as it is at this time. The higher grades are still available on a basis of $10.50 at furnace for No. 2 foundry and No. 2 soft. The number of producing stacks has been lessened by the closing down of the Woodstock furnace at Anniston, operated by the receivers of the Anniston Iron Corporation, and it is generally accepted that two other stacks now operating in this district will have to be put out for repairs between this time and July 1, with practically no prospect of any increase in the present rate of production. Operators of stacks now running have been looking ahead to be sure that they are not going to have trouble as to their supply of raw material and it is not felt that any strike of the coal miners in the United States will materially affect the coke supply for this district. It would be difficult to quote the market at this time because, so far as the South is concerned, it is undoubtedly much stronger than any other portion of the country. Certainly quotations are no lower than the following schedule, per gross ton, f.o.b. cars Birmingham:

| | |
|---|---|
| No. 1 foundry and No. 1 soft | $11.00 |
| No. 2 foundry and No. 2 soft | 10.50 |
| No. 3 foundry | 10.00 |
| No. 4 foundry | 9.75 |
| Gray forge | 9.50 |
| Standard basic | 10.50 |
| Off basic | 10.00 |
| Charcoal carwheel iron | $22.00 to 22.50 |

**Cast Iron Pipe.**—Manufacturers of pipe are now most concerned in seeing that they obtain regularly the coke and pig iron necessary to keep them running. Pipe making iron is exceedingly scarce on the yards of furnaces, and foundries are making inroads daily on the stock in their own yards. With the possibility of trouble in coal mining districts outside of the South, all foundries throughout the country seem very much disturbed about a supply of foundry coke. The pipe makers report sales at prices that are evidently quite satisfactory. It is understood that no large tonnages are at the moment involving consideration, but there is a continuous steady flow of small orders that keeps the production here fully up to the average for the past year. Quotations continue at the following schedule, per net ton, f.o.b. foundries this district: 4 to 6 in., $23; 8 to 12 in., $22; over 12 in., average, $21, with the usual differential of $1 per ton higher for gas pipe.

**Old Material.**—The recent improvement noted seems likely to be maintained. There is a good inquiry before the Birmingham dealers now and they continue quoting per gross ton f.o.b. yards as follows:

| | | |
|---|---|---|
| Old iron axles (light) | $12.50 to | $13.00 |
| Old steel axles (light) | 11.50 to | 12.00 |
| Old iron rails | 11.50 to | 12.00 |
| No. 1 railroad wrought | 10.50 to | 11.00 |
| No. 2 railroad wrought | 9.00 to | 9.50 |
| No. 1 country wrought | 6.00 to | 6.50 |
| No. 2 country wrought | 5.50 to | 6.00 |
| No. 1 machinery | 8.50 to | 9.00 |
| No. 1 steel | 8.00 to | 8.50 |
| Tram car wheels | 7.50 to | 8.00 |
| Standard car wheels | 9.50 to | 10.00 |
| Light cast and stove plate | 6.00 to | 6.50 |

**Coal and Coke.**—Practically all the best grades of steam coal have been marked up, and the bulk of output available for early delivery is already engaged. The producers in this district feel that they may confidently expect a much better run of business than they had last spring and summer. Coke has shown an advance in price, the best grades of 72-hour foundry bringing $3.75 to $4 at oven, while furnace coke is bringing $2.75 to $3.25 at oven. There has recently been considerable activity in the purchase and sale of Alabama coal property.

## St. Louis

ST. LOUIS, MO., March 18, 1912.

A thoroughly optimistic feeling pervades the market here, though the immediate developments in new business have not as yet run into large totals. The belief is very general that consumers are taking from hand to mouth, but that there is certain to be activity of a decided sort in the very near future. Shipments and collections continue excellent.

**Pig Iron.**—Prices remain firm, though without apparent upward tendency. New business is chiefly in small lots, but from such sources and of such character that dealers regard consumption as right on the heels of demand. Shipments of specifications on contracts are going forward well. Inquiries in the market include 1000 tons of No. 3, 500 tons of No. 2 and 200 tons of No. 4, these of speculative character, while other inquiries embrace 150 tons of No. 4 Southern, 100 tons of Northern No. 2, 150 tons of carwheel iron, 300 tons of No. 3 Southern, 100 tons of No. 2 foundry and 150 tons of No. 1 soft. These indicate the character of the business being done. Quotations continue firm at $10.50 for No. 2 Southern and $13 for No. 2 Northern, Ironton basis. In basic and malleable there is no inquiry of moment at the present time.

**Old Material.**—Prices are apparently ready to move in either direction. There is some fear that the spring weather, enabling the picking up of scrap, will send a flood into the market at the beginning of the coming month and dealers are balancing themselves for a jump either way, according to the developments. The lists closing last week went at better prices than was anticipated, though for what reason it is difficult to determine, owing to the secrecy which dealers are throwing about their movements. We quote prices, f.o.b. St. Louis, as follows:

*Per Gross Ton.*

| | | |
|---|---|---|
| Old iron rails | $14.00 to | $14.50 |
| Old steel rails, re-rolling | 11.00 to | 11.50 |
| Old steel rails, less than 3 ft | 11.25 to | 11.75 |
| Relaying rails, standard section, subject to inspection | 21.50 to | 22.00 |
| Old car wheels | 13.25 to | 13.75 |
| Heavy melting steel scrap | 10.50 to | 11.00 |
| Frogs, switches and guards cut apart | 10.00 to | 10.50 |

*Per Net Ton.*

| | | |
|---|---|---|
| Iron fish plates | $12.50 to | $13.00 |
| Iron car axles | 17.50 to | 18.00 |
| Steel car axles | 15.00 to | 15.50 |
| No. 1 railroad wrought | 11.00 to | 11.50 |
| No. 2 railroad wrought | 10.00 to | 10.50 |
| Railway springs | 9.25 to | 9.75 |
| Locomotive tires, smooth | 11.00 to | 11.50 |
| No. 1 dealers' forge | 8.00 to | 8.50 |
| Mixed borings | 6.00 to | 6.50 |
| No. 1 busheling | 8.50 to | 9.00 |
| No. 1 boilers, cut to sheets and rings | 7.50 to | 8.00 |
| No. 1 cast scrap | 10.00 to | 10.50 |
| Stove plate and light cast scrap | 8.00 to | 8.50 |
| Railroad malleable | 8.50 to | 9.00 |
| Agricultural malleable | 7.50 to | 8.00 |
| Pipes and flues | 7.50 to | 8.00 |
| Railroad sheet and tank scrap | 7.00 to | 7.50 |
| Railroad grate bars | 8.00 to | 8.50 |
| Machine shop turnings | 7.00 to | 7.50 |

**Coke.**—The situation is almost desperate for those in immediate need of coke in this territory. The response to inquiries very generally is that coke is not to be had from the Connellsville district and that cars cannot be had for shipments from Virginia. The price of 72-hr. best selected Connellsville or Stonega at present writing is $3 at oven, with no assurance that business can be done at that figure if the quotation is not imme-

diately accepted. The sales put through under these conditions in the week included one lot of 500 tons and another of 250 tons of new business. By-product coke is keeping pace with the other qualities.

**Finished Iron and Steel.**—Business in the finished products has been chiefly in steel rails. A sale of 1000 tons was made to a Texas road; the Wabash ordered 5000 tons additional to its recent order, and an Arkansas road placed an order for seven miles of 60-lb. rails. Track fastenings, quotable at $1.55 for spikes at St. Louis, are very active. In light rails the lumber companies have been taking more than for some time, but the coal interests are not in the market. Structural tonnage shows a fair movement of new business, the orders being for specific work and quick shipment demanded. The movement on contracts continues free. Plates are stronger than for some time, with a better movement and the price held at 1.15c., Pittsburgh. In bars the specifications are fair at 1.10c., Pittsburgh, with the price held firm.

## Buffalo

BUFFALO, N. Y., March 19, 1912.

**Pig Iron.**—Inquiry continues to be of good volume and prices have stiffened further. Between 10,000 and 12,000 tons of all grades have been placed and 4000 to 5000 tons are under consideration. There is a strong run of carload lot business at full prices. There is as yet no general inquiry for last half delivery and as a rule furnacemen are not inclined to quote for the second half. What business is being taken for such delivery is at advanced prices. It is stated that the New York Air Brake Company has closed with a western New York furnace for 6000 to 8000 tons of foundry grades for deliveries extending into last half at prices somewhat above first half schedule. A fairly good inquiry for charcoal iron is noted; also for malleable. Indications are all toward increasing consumption, with continued insistent demand from consumers for shipment on old contracts amounting to a large aggregate tonnage daily. Coke is scarce and the price has advanced equivalent to 75c. per ton. We quote as follows for current and second quarter delivery f.o.b. Buffalo:

| | |
|---|---|
| No. 1 X foundry | $14.00 to $14.50 |
| No. 2 X foundry | 14.00 to 14.25 |
| No. 2 plain | 13.75 to 14.00 |
| No. 3 foundry | 13.50 to 13.75 |
| Gray forge | 13.25 to 13.50 |
| Malleable | 13.75 to 14.25 |
| Basic | 14.00 to 14.50 |
| Charcoal | 15.75 to 17.25 |

**Finished Iron and Steel.**—The market has strengthened materially and has an upward trend, with a generally better sentiment. Prices are decidedly stiffer, 1.10c. Pittsburgh base being absolute minimum on steel bars and 1.15 for plates and shapes with $1 per ton additional for less than carload lots. One interest states it is not quoting anything below 1.20c. for plates and shapes. Another agency names 1.20c. as minimum for universal plates and 1.25c. for iron bars. Deliveries are becoming more extended in all lines, particularly in steel bars. Some business in railroad material and track supplies is noted, and spikes are quoted at $1.40 per 100 lb., Pittsburgh base. The outlook in plates is noticeably brighter and fabricated structural material is now very active on account of improved weather conditions for outside work. The Eastman Kodak Company, Rochester, placed an order last week for its factory building No. 23 taking 150 tons of Bethlehem shapes. The George Kellogg Structural Company, Buffalo, was low bidder for fabricating the Charles B. Hill store and loft building, Buffalo, 150 tons. Specifications will be out this week for the Foster-Milburn Company factory and laboratory building, Buffalo, 350 tons, and Wood & Bradney, architects, Mutual Life Building, Buffalo, will soon be ready to take figures for the Buffalo Natural Gas Fuel Company's office building, about 900 tons. Franklin B. Ware, State architect, Albany, has plans completed for the new State Normal School at Buffalo, for which the Legislature has appropriated $100,000 for preliminary work, the total cost being estimated at $400,000. Fred W. Saar, Fulton, N. Y., has received the general contract for the Oswego Canal Division of the Erie Barge Canal. A considerable quantity of reinforcing steel will be required.

**Old Material.**—The general trend is upward. Heavy melting steel has advanced 25 to 50c. per ton. Demand is fair and becoming larger for many lines of material, and dealers are holding firmly to prices asked. Shipments are now moving with very little congestion; the railroads having about cleared up delayed commitments. We quote as follows, per gross ton, f.o.b., Buffalo:

| | |
|---|---|
| Heavy melting steel | $12.75 to $13.25 |
| Low phosphorus steel | 15.75 to 16.00 |
| No. 1 railroad wrought | 14.00 to 14.25 |
| No. 1 railroad and machinery cast scrap | 13.50 to 14.00 |
| Old steel axles | 18.50 to 19.25 |
| Old iron axles | 22.00 to 22.50 |
| Old car wheels | 11.75 to 12.00 |
| Railroad malleable | 12.50 to 12.75 |
| Boiler plate, sheared | 13.75 to 14.25 |
| Locomotive grate bars | 11.00 to 11.25 |
| Pipe and tank | 9.50 to 10.00 |
| Wrought iron and soft steel turnings | 7.50 to 7.75 |
| Clean cast borings | 6.75 to 7.25 |

## San Francisco

SAN FRANCISCO, CAL., March 13, 1912.

A well-distributed rainfall this month has relieved anxiety. While crops had doubtless suffered to some extent, conditions are now favorable for a fair yield of most California products. The rain has slightly reduced the demand for some descriptions of sheets and pipe used in irrigation, but the movement of other steel products shows considerable improvement, especially in the distributive trade. Some acceleration is usually expected at this season, however, and current business shows no very great increases over that of a year ago. There is little in the present situation to warrant expectations of any material improvement later in the year. Specifications continue to come out at a satisfactory rate, but new business is quiet, and with few exceptions merchants are keeping their supplies very low. Jobbing values are steadily maintained on a fairly profitable basis.

**Bars.**—Orders for soft steel bars from the small consuming trade are more in evidence than for several months, and both merchants and the larger manufacturing interests are specifying freely for their current requirements, though orders for future shipment have so far been very moderate, the local trade being well protected against fluctuations in price. The Pacific Coast Steel Company, South San Francisco, has commenced rolling soft steel flats and rounds on an order from the Pacific Hardware & Steel Company. Small orders for reinforcing bars aggregate a fair tonnage, but prospects for improvement in this line are rather doubtful, owing to delay in large construction projects. Open-hearth reinforcing bars are quoted at 1.95c. Soft steel bars, from store, San Francisco, are quoted at 2.10c., and iron bars at 2c.

**Structural Material.**—Inquiries for structural work are gradually increasing, though the tonnage actually ordered is not heavy. The cost building situation is encouraging, most cities showing a material gain over February, 1911, though the increase consists mainly of small work. The total of permits for February in San Francisco was $1,764,252, compared with $1,870,617 for January. A 400-ton contract for the Grauman Theater in this city has been placed with Milliken Bros., and the Ralston Iron Works will fabricate about 300 tons for the McCreery building. Plans for the new Tivoli Theater, this city, are out for figures, about 900 tons being required, and estimates are also being taken on the Kahn Bros.' building in Oakland, which will take about 2600 tons, though there may be some delay in placing the contract. The Regents of the University of California have about decided on a steel-frame building for their Sutter street project, and a contract is expected shortly. The Pacific Telegraph & Telephone Company has plans for a 14-story building at Portland, Ore., and inquiries are expected shortly on several other large projects. The Globe grain elevators at Los Angeles will be of concrete.

**Rails.**—Several fair orders have been placed recently by interurban and street railroads, and small orders for both light and standard sections are increasing. A substantial increase in tonnage is expected within the next six or eight weeks, as several lines in the interior are completing plans for extensions, and some new projects seem to be about ready for business. The C. A. Smith Lumber Company is planning an 80-mile road in the El Dorado County district.

**Sheets.**—Orders from riveted pipe manufacturers are coming out fairly well for current needs, though prospective business has diminished considerably with the breaking of the drought. The jobbing movement of black and galvanized sheets is keeping up in good shape, and merchants' specifications are going forward freely, supplies in store being but little ahead of immediate requirements.

Plates.—A little more inquiry is noted, both for tank and marine plates, though there is nothing of much importance in sight. The Schaw-Batcher Company, Sacramento, Cal., has an order for 17 oil tanks for the Western Pacific, amounting to about $10,000, and the Union Iron Works has a contract for a good-sized steel steamer for the Loop Lumber Company. The general run of small business continues about as before. The Associated Oil Company is planning a large refining plant, but some time may elapse before anything is done on it.

**Merchant Pipe.**—The movement is a little larger than a year ago, though the jobbing trade has dropped off slightly in the last few weeks. A fair demand is anticipated, however, from now until the end of April. Many small orders are being booked, especially for converse-joint lap-weld pipe, for use in waterworks. Oil-country goods are still rather quiet, but the outlook for large oil-line projects appears more favorable.

**Cast Iron Pipe.**—No particularly large orders have been placed for some time, though a fair tonnage has been booked in southern California, and there is a steady run of small general business. An active demand is expected in Oregon and Washington, where plans are under way for many new water plants and extensions. The town of Vallejo will be in the market shortly for another lot of 4- and 6-in. pipe, and the city of Sacramento has just taken bids on a lot of 6-in. The town of Orland, Cal., will open bids March 25 for a complete waterworks system.

**Pig Iron.**—Local foundry requirements show little increase, and most melters have plenty of pig iron on hand for immediate requirements, though there is a fair amount of business in a small way for delivery from warehouse, and a few orders are being booked for Southern foundry iron. Prices show little change, quotations being as follows: Chinese foundry iron, $23; English and Continental, ordinary brands, $22; No. 2 Southern foundry iron, $20.50.

**Old Material.**—Cast iron scrap is moving only in a small way, and there is little new business in wrought scrap or rerolling rails, the available tonnage of the latter being well taken up by existing contracts. Current business in steel melting scrap is fair, and a larger movement is expected, as an Eastern buyer is in this market with an inquiry for about 15,000 tons. Prices are as follows: Cast iron scrap, per net ton, $14; steel melting scrap, per gross ton, $11.50; wrought scrap, per net ton, $12.50 to $15; rerolling rails, per net ton, $11.

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The ship Edward Sewall, 126 days from New York, has just arrived here with 5500 tons of finished steel for the Pacific Hardware & Steel Company. The same company is loading another cargo of steel on the steamer Cordova at Philadelphia.

The contract for steel castings for the navy collier now building at the Mare Island Navy Yard has been awarded to the Columbia Steel Company, Pittsburg, Cal.

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## Boston

BOSTON, MASS., March 19, 1912.

**Old Material.**—Sentiment continues to improve in the scrap market, and the trade looks for higher prices. As a result few transactions are reported, everyone preferring to hang on to stocks on hand. Actual quotations have not changed in the week. The first advance expected is on heavy melting steel. The prices quoted below are those offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

| | |
|---|---|
| Heavy melting steel | $8.75 to $9.00 |
| Low phosphorus steel | 11.45 to 11.95 |
| Old steel axles | 14.00 to 14.50 |
| Old iron axles | 17.00 to 18.00 |
| Mixed shafting | 13.00 to 13.50 |
| No. 1 wrought and soft steel | 10.00 to 10.50 |
| Skeleton (bundled) | 7.00 to 7.50 |
| Wrought iron pipe | 8.50 to 9.00 |
| Cotton ties | 7.00 to 7.50 |
| No. 2 light | 4.50 to 5.00 |
| Wrought turnings | 6.00 to 6.50 |
| Cast borings | 5.50 to 6.00 |
| Machinery, cast | 12.50 to 13.00 |
| Malleable | 8.75 to 9.25 |
| Grate bars | 6.00 to 6.50 |
| Stove plate | 8.00 to 8.50 |
| Cast iron car wheels | 11.75 to 12.00 |

## British Situation Worse

### Pig Iron Shipments Refused—Further Sales of American Steel

(*By Cable.*)

BIRMINGHAM, ENGLAND, March 21, 1912.

Matters can hardly get worse in the iron and steel trades. The railroads are refusing to handle pig iron and in mineral traffic distress is developing. The dockers at Middlesbrough refuse to discharge German coal. Prices are all nominal. American independent steel companies and the United States Steel Corporation are reported to be pushing business in steel on this side. The former have sold 40,000 tons of sheet bars at about 95s c.i.f Wales and have now raised the price to 97s 6d for July-December delivery. Continental steel makers are indifferent, being well sold. Some consumers are negotiating further lots of billets and sheet bars. Stocks of pig iron are still decreasing. We quote the market as follows, there being slight advances in pig iron and tin plates, as was the case one week ago:

Cleveland pig iron warrants (closing Tuesday,), 51s 2½d.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s 9d.

German sheet bars, f.o.b. Antwerp, 95s.

German 2-in. billets, f.o.b. Antwerp, 92s.

Steel bars, export, f.o.b. Clyde, £6 12s 6d.

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £6 2s 6d.

Steel ship plates, Scotch, delivered local yard, £7 7s 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9.

Steel rails, export, f.o.b. works port, £5 17s 6d.

Tin plates, cokes, 20 x 14, 112 sheets, 108 lb., f.o.b. Wales, 14s for prompt and 13s 6d to 13s 9d for forward delivery.

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## New York

NEW YORK, March 20, 1912.

**Pig Iron.**—Further inquiry has come out, due evidently to the more hopeful view taken of the situation since the large purchases of steelmaking pig iron in the Central West. It is hard to make out whether the expectation of an anthracite strike has figured in the pig iron market, though there is no mistaking its effect on the coal and coke markets. Foundries have been putting in their requisitions for additional shipments of coke and in some cases have paid fancy prices. So little anthracite is used in pig iron manufacture in the East that a strike would not disturb blast furnace operations to any extent, except as the increased demand for coke might make it more difficult to secure usual shipments from the western Pennsylvania districts. In the past week a number of good sales of pig iron have been made, two companies manufacturing railroad equipment having taken about 15,000 tons. One of these bought 5000 tons of basic and about an equal amount of malleable. The other company has been in the market for four descriptions of pig iron—including malleable, foundry and off malleable. Its purchases so far are reported at several thousand tons. A number of New York State foundries, whose products represent car wheels, radiators and malleable and gray iron castings, have been buyers. A variety of deliveries is called for, some reaching to the end of the third quarter. Higher prices have resulted from these purchases and furnaces are asking from 25 to 50 cents above the basis of sales made two weeks ago. Several New England foundries have been buyers and one New England company has taken on basic iron. Virginia furnaces have advanced their prices slightly, and as a rule are quoting $12.50 to $12.75 for No. 2 X. One interest is asking as high as $13. Buffalo furnaces have made advances also. Thus far there has not been a great amount of activity in eastern Pennsylvania, though some inquiry has developed there. Coke seems to be of more immediate importance to the average foundry than pig iron. We quote as follows for Northern iron at tidewater; No. 1 foundry, $15 to $15.25; No. 2 X, $14.75 to $15; No. 2 plain, $14.50 to $14.75. We quote Southern iron at $14.75 to $15 for No. 1 foundry and $14.50 to $14.75 for No. 2.

**Finished Iron and Steel.**—Without any general increase in the volume of material demanded by specifications on contracts and without any betterment in the price situation as regards structural material or fabricated material, a much better tone pervades the trade. The most positive indication of improvement is perhaps shown in the plate business, which is stronger as regards prices and which has been sufficiently large in volume to bring at least one Eastern plate mill to 90 per cent. plant capacity. Fabricators report figuring on quite a volume of business, mainly loft buildings, but with some apartment houses, but pending work is still slow in closing. Complaints regarding belated deliveries of material owing to railroad congestion are no longer numerous. Some of the structural work closed recently includes the Young Women's Christian Association Building, Newark, N. J., 800 tons, to the Levering & Garrigues Company; a loft building on West Twenty-fifth street, 800 tons, to the Hinkle Iron Company; a loft at 534 West Broadway, 400 tons, and a loft at 50 Eldredge street, 250 tons, both to the Alfred E. Norton Company and both likely to be built largely with Bethlehem steel; a loft on East Twenty-third street, 600 tons, to the American Bridge Company; theater, Broadway and Forty-seventh street, 1000 tons, to the George A. Just Company, and a 12-story loft building, 112 Madison avenue, 1000 tons, to Milliken Brothers. It is understood that a contract for 2000 tons of bridge material for the Long Island Railroad has been closed, and one of 1200 tons for a loft building at Seventh avenue and Fourteenth street is regarded as practically settled. The barge canal bridge at Oswego for the New York Central, 1700 tons, has again come up and a 1000-ton warehouse structure, Walnut avenue and 134th street, is under consideration, although a reinforced concrete building may be decided on. Purdy & Henderson are the low bidders for a Government pier at Ponce, Porto Rico, involving about 1000 tons. Plans are out for the Stern Brothers store building, involving 6000 or 7000 tons of steel. Quotations are: Steel bars and plain structural material, 1.26c. to 1.31 c.; plates, 1.31c. to 1.36c.; bar iron, 1.25c. to 1.30c., all New York. Plain material from store, New York, 1.65c. to 1.75c.

**Cast Iron Pipe.**—The demand continues active, although public lettings, while fairly numerous, are not now calling for any considerable quantities. Water and gas companies are privately buying and are usually taking 50 per cent. more than at the corresponding time last year. The foundries are steadily filling their order books. It is quite confidently expected that New York City will be in the market shortly for an additional large quantity of pipe for the extension of the high-pressure fire protection system. The United States Cast Iron Pipe & Foundry Company was low bidder on 3000 tons of pipe and special castings for the city of Rochester, N. Y., on which bids were opened March 13. Although the pipe trade is in much better shape than at any time in the past few months, prices do not advance as might be expected because some makers still appear desirous of securing more business and therefore make low bids on contracts open for competition. Prices on carload lots of 6 in. are continued at $22 to $23, tidewater, per net ton.

**Old Material.**—The improvement which has occurred in Western markets is making itself felt to some extent in this section. Consumers are taking more interest in old material and prices are slowly hardening. Better buying by rolling mills has caused some advance in borings and turnings. Heavy melting steel scrap has been sold in moderate quantities and prices are slightly higher. Old car wheels seem to have been cleaned up in this vicinity, inquiries having failed to uncover any stock. Quotations are as follows, per gross ton, New York and vicinity:

| | |
|---|---|
| Old girder and T rails for melting | $9.50 to $10.00 |
| Heavy melting steel scrap | 9.50 to 10.00 |
| Relaying rails | 20.00 to 20.50 |
| Rerolling rails (nominal) | 11.75 to 12.00 |
| Iron car axles | 19.00 to 20.00 |
| Old steel car axles | 13.50 to 14.00 |
| No. 1 railroad wrought | 12.00 to 12.50 |
| Wrought iron track scrap | 11.00 to 11.50 |
| No. 1 yard wrought, long | 10.00 to 10.50 |
| No. 1 yard wrought, short | 9.50 to 10.00 |
| Light iron | 4.25 to 4.75 |
| Cast borings | 6.00 to 6.50 |
| Wrought turnings | 6.75 to 7.25 |
| Wrought pipe | 9.75 to 10.25 |
| Old car wheels (nominal) | 11.50 to 12.00 |
| No. 1 heavy cast, broken up | 11.00 to 11.50 |
| Stove plate | 8.75 to 9.00 |
| Locomotive grate bars | 9.00 to 9.50 |
| Malleable cast | 9.00 to 9.50 |

**Ferroalloys.**—The local market has been quiet. Ferromanganese, 80 per cent., for forward delivery, is still being quoted at $41, Baltimore, and spot up to $42.50 for small lots. There is ferromanganese afloat, headed for this country, but no new shipments have been reported. It is predicted that any great increase of activity on the part of the steel makers will put the price to $45. Ferrosilicon is quiet at $70, Pittsburgh, for carload lots and $69 or less for larger quantities.

# Metal Market

NEW YORK, March 20, 1912.

### The Week's Prices

Cents Per Pound for Early Delivery.

| | Copper, New York. | | | Lead | | Spelter | |
|---|---|---|---|---|---|---|---|
| Mar. | Lake. | Electrolytic. | Tin, New York. | New York. | St. Louis. | New York. | St. Louis. |
| 14 | 14.62½ | 14.50 | 42.25 | 4.00 | 3.95 | 7.10 | 6.95 |
| 15 | 14.62½ | 14.50 | 42.40 | 4.00 | 3.95 | 7.10 | 6.95 |
| 16 | 14.62½ | 14.62½ | .... | 4.00 | 3.95 | 7.10 | 6.95 |
| 18 | 14.75 | 14.62½ | 42.35 | 4.00 | 3.95 | 7.05 | 6.90 |
| 19 | 14.75 | 14.62½ | 42.35 | 4.10 | 4.05 | 7.05 | 6.90 |
| 20 | 14.75 | 14.62½ | 42.15 | 4.10 | 4.05 | 7.05 | 6.90 |

Copper is higher and strong. Tin is weaker under light demand. Lead prices have been advanced. Spelter is easier and lower. Cookson's antimony is quoted higher.

### New York.

**Copper.**—Copper in the last week was quiet up to Friday when a fair amount of business developed and lasted over Saturday, especially for electrolytic. The activity caused an advance of ⅛c. in electrolytic and Lake copper followed. Electrolytic is quoted to-day at 14.62½c. New York, and 14.75c., cash 30 days, delivered to the Naugatuck Valley. A peculiarity of the situation is that copper has been offered within the last week at a shade lower than market prices but not taken, which is regarded as an indication that consumers are well supplied. On the other hand, there is a belief that certain large buyers must come into the market soon. The price of spot copper is quoted in London at £66, an advance of £1 over yesterday; futures at £66 15s. The exports of copper this month have been 14,015 tons.

**Pig Tin.**—The most notable feature of the week has been the sales of tin on the floor of the New York Metal Exchange. On March 14, 120 tons of spot and nearby was sold; on March 18, 25 tons of spot and nearby, and on March 19, 225 tons, mostly for future delivery. Little business was done outside of the Exchange. There is ample stock on hand in view of the light demand, and a considerable quantity is afloat despite the British coal strike which is interfering with other shipments. The Minnetonka, due here March 25, has 1500 tons aboard. The London quotation for spot tin to-day is £190 5s.; futures, £186 15s. The arrivals of tin this month have been 2104 tons and there is afloat 2990 tons.

**Tin Plates.**—There is little that is new in tin plates except that the car shortage is to some extent interfering with deliveries from the mills which are reported as running at almost full capacity to keep up with the heavy demands from can manufacturers and other users. Tin plates are quoted at Swansea, Wales, at the unchanged price of 13s. 6d., and 100 lb. coke plates are quoted in New York at $3.54.

**Lead.**—In the lead market the increase in price which has been anticipated for some weeks came late on the afternoon of March 19, when the American Smelting & Refining Company announced that it had advanced its price from 4c. to 4.10c., New York. It is understood that the company was practically compelled to raise the price because of the heavy drain upon its production at the low figures which have prevailed. The independents have been getting business at figures higher than those quoted by their big competitor both in New York and St. Louis. Consumers are believed to have bought all the lead they could at the low price and as a result further heavy buying was discouraged.

**Spelter.**—Considerable weakness developed in spelter within the last week and a decline has set in, although the scarcity of spelter for early delivery continues. Prior to and during the recent rise in the price of the metal consumers bought heavily and it is now believed that some of them are overstocked. Carload lots of spot spelter are quoted as high as 7.25c. In view of the scarcity, 7.05c., New York, is said to be a conservative quotation for early delivery, and 6.65c. to 6.70c., New York, for April and May.

**Antimony.**—Cookson's antimony has been advanced to 7.62½c., but otherwise the market is unchanged. Hallett's is quoted at 7.37½c. and Hungarian and Chinese grades at 6.80c.

Old **Metals.**—The demand continues good and the market is firm at the following selling prices:

| | Cents per lb. |
|---|---|
| Copper, heavy and crucible | 13.50 to 14.00 |
| Copper, heavy and wire | 13.25 to 13.50 |
| Copper, light and bottoms | 12.00 to 12.25 |
| Brass, heavy | 8.75 to 9.00 |
| Brass, light | 7.00 to 7.25 |
| Heavy machine composition | 11.00 to 11.25 |
| Clean brass turnings | 8.25 to 8.50 |
| Composition turnings | 9.50 to 10.00 |
| Lead, heavy | 3.75 |
| Lead, tea | 3.50 |
| Zinc, scrap | 5.25 |

### Chicago

MARCH 19.—The market is characterized by the continued upward trend of copper values. Substantial purchases of this metal are recorded. The spelter position remains unchanged with the supply very scarce and quotations largely nominal. We quote as follows: Casting copper, 14.62½c.; Lake, 14.87½c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 43.50c.; small lots, 45.50c.; lead, desilverized, 4c. to 4.05c., for 50-ton lots; corroding, 4.25c. to 4.30c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.90c. to 7c.; Cookson's antimony, 8.50c., and other grades, 7.50c. to 8c., in small lots; sheet zinc is $8.50, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 12,12½c.; copper bottoms, 11.12½c.; copper clips, 11.87½c.; red brass, 11.12½c.; yellow brass, 8.75c.; lead pipe, 3.60c.; zinc, 4.50c.; pewter, No. 1, 26c.; tinfoil, 34c.; block tin pipe, 37c.

### St. Louis

MARCH 18.—The demand for metals has been quite good and the movement has been fair. Spelter shows a little easing up from its recent high price, with the result that to-day's quotation is 6.70c. to 6.80c., the latter for spot. Lead is 4c. for spot and well held. Tin is strong at 42.90c.; Lake copper, firm at 14.97½c.; electrolytic, 14.90c., and Cookson's antimony, 7.60c. In the Joplin ore market, on an assay basis of $54 for ores carrying 60 per cent. metal, the top price for zinc blende during the week was $58. Lower grade ores brought a $55 basis and the basis ranged down as low as $52. The general offerings were weaker as production has largely increased with the better weather. Calamine production is small, with the price at $26 to $28 for 40 per cent., the choice lots running as high as $33. Lead ore found a slow market at $50 to $54. Miscellaneous scrap we quote as follows: Light brass, 5c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 10c.; zinc, 3.50c.; lead, 3.50c.; pewter, 21c.; tin foil, 31c.; tea lead, 3c.

## Iron and Industrial Stocks

NEW YORK, March 20, 1912.

The stock market continued its rise the past week, ignoring what might be considered somewhat unfavorable conditions. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

| | | | |
|---|---|---|---|
| Allis-Chalm., com... | ¾- 1 | Nat. En. & St., pref. | 89 - 90 |
| Allis-Chalm., pref... | 3¾- 5⅛ | Pittsburgh St., pref. | 101 -102 |
| Baldwin Loco., com. | 50¾- 50⅞ | Pressed Steel, com.. | 31⅜- 33¾ |
| Baldwin Loco., pref. | 104 -105 | Pressed Steel, pref.. | 100⅞-101 |
| Beth. Steel, com.... | 30½- 31 | Railway Spring, com. | 29½- 31 |
| Beth. Steel, pref... | 59½- 60⅛ | Railway Spring, pref. | 100 -100⅛ |
| Can, com. | 13⅜- 16⅞ | Republic, com..... | 19⅜- 22 |
| Can, pref. | 95 - 98¼ | Republic, pref..... | 71½- 73½ |
| Car & Fdry., com.. | 54¼- 56 | Sloss, com..... | 41½- 45 |
| Car & Fdry., pref.. | 116 -118 | Pipe, com..... | 14⅜- 16¼ |
| Steel Foundries..... | 28 - 30½ | Pipe, pref..... | 51¾- 52¾ |
| Colorado Fuel..... | 25 - 27¼ | U. S. Steel, com... | 64⅜- 67⅜ |
| General Electric.... | 164½-167¾ | U. S. Steel, pref... | 110 -111½ |
| Gr. N. Ore Cert... | 36½- 40½ | Westinghouse Elec.. | 74 - 76¼ |
| Int. Harvester, com. | 113½-117¾ | Va. I. C. & Coke... | 62 - 62½ |
| Int. Harvester, pref. | 120½-121 | Am. Ship, com..... | 47 - 47¾ |
| Int. Pump, com.... | 29½- 31⅜ | Am. Ship, pref..... | 104 |
| Int. Pump, pref.... | 81 - 81½ | Chic. Pneu. Tool... | 44 - 45¼ |
| Lackawanna Steel... | 28 - 30 | Cambria Steel..... | 41⅜- 42¼ |
| Locomotive, com.... | 36 - 37⅝ | Lake Sup. Corp.... | 28 - 29⅞ |
| Locomotive, pref.... | 107½ | Crucible Steel, com. | 10⅜- 11¾ |
| Nat. En. & St., com. | 14⅜- 15¾ | Crucible Steel, pref. | 82 - 84¼ |

The Studebaker Corporation has issued $8,000,000 5 per cent. notes. The issue is underwritten by Goldman, Sachs & Co., Lehmann Bros. and Kleinwort Sons & Co. of London. Vice-president Studebaker says: "The company's earnings for 1911, applicable to interest charges, exceeded $2,500,000. The proceeds will be used toward liquidating the company's floating debt. It has no other funded debt." The underwriters are offering the notes at 98 and interest.

### Dividends Declared

The Otis Elevator Company, regular quarterly, 1½ per cent. on the preferred stock, and 1 per cent. on the common, both payable April 15.

The American Brake Shoe & Foundry Company, regular quarterly, 1¾ per cent. on the preferred and 1¾ per cent. on the common stock, both payable March 30.

The United Shoe Machinery Company, regular quarterly, 1½ per cent. (37½c.) per share on the preferred and 2 per cent. (50c.) per share on the common stock, both payable April 5.

The M. Rumely Company, $2.34 a share for four months on the preferred stock, representing an initial quarterly disbursement of 1¾ per cent. and a dividend for the extra month since the stock was issued, payable April 1.

The J. I. Case Threshing Machine Company, quarterly, 1¾ per cent., payable April 1.

The Yale & Towne Mfg. Company, regularly quarterly, 1½ per cent. and an extra of 1 per cent., payable April 1.

The American Iron & Steel Mfg. Company, regular quarterly, 1¼ per cent. each on the common and preferred stocks, payable March 23.

The Westinghouse Air Brake Company, regular quarterly, 2½ per cent., an extra of 1½ per cent. and a special of 1 per cent., payable April 10.

The Union Switch & Signal Company, regular quarterly, 3 per cent. on the common and 3 per cent. on the preferred stocks, payable April 1.

The Brier Hill Steel Company, initial dividend of 1¾ per cent. on the preferred stock, payable April 1.

The Independent Pneumatic Tool Company, quarterly, 2½ per cent., payable April 10.

## Personal

Frank F. Gallaher, now superintendent of the New York Shipbuilding Company, will take charge April 1 of the plant of the Knox Pressed & Welded Steel Company at Niles, Ohio, as general superintendent, and will have exclusive charge of all plant operations. Besides making its patented water-cooled open-hearth furnace doors, frames and ports, the Knox Company is now in a position to quote on annealing boxes and galvanizing kettles of all descriptions, as well as general pressed and welded work.

Henry M. Wilson, formerly in the sales department of the Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, has been appointed district sales agent, with headquarters in the Rockefeller Building, Cleveland, Ohio.

John C. Schmidt, president of the Standard Chain Company, Pittsburgh, has sailed for Europe, to be gone about four months.

E. A. Wilson has resigned as manager of the Ohio File Renewing Company to become manager of the metal lath department of the Brier Hill Steel Company, Youngstown, Ohio.

George A. Claypool, assistant sales manager of the Republic Iron & Steel Company, Oliver Building, Pittsburgh, has gone on a trip to the Bermudas and Panama.

James A. Campbell, president of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has gone to Hot Springs, Ark.

Peter Kirkevaag, who has been employed by the William Tod Company, Youngstown, Ohio, for 27 years as draftsman and mechanical engineer, has resigned.

W. W. Burritt has been appointed sales manager for the Asbestos Protected Metal Company, Beaver Falls, Pa. This company manufactures asbestos covered roofing and siding.

H. R. Setz, hitherto chief engineer for the Struthers-Wells Company, Warren, Pa., has been appointed chief engineer of the Otto Gas Engine Works, Philadelphia, Pa. He has been identified with several American and European gas and oil engine factories and will give his special attention to the further development of Otto-Diesel engines.

Dr. Wilhelm Schumacher, one of the directors of the General Briquetting Company, 25 Broad street, New York, and also of the Allgemeine Brickettierungs Gesellschaft, Berlin, Germany, is in New York, and will make a tour of inspection of blast furnace plants in the interest of the briquetting of flue-dust.

F. H. Forman, who went to Los Angeles, Cal., some months ago to represent the Pittsburgh Steel Company in the selling of wire and wire nails, and also to benefit his health, has returned to Pittsburgh greatly improved, and has accepted the position of assistant general manager of sales of the same company with headquarters in the Frick Building, Pittsburgh.

Charles J. Mesta, vice-president of the Mesta Machine Company, Pittsburgh, has resigned to become president and general manager of the Hubbard Steel Foundry Company, East Chicago, Ind. The vacancy in the Mesta Machine Company has not yet been filled.

H. P. Bope, vice-president of the Carnegie Steel Company, Pittsburgh, is in Mexico on business.

J. C. Frank, for 12 years purchasing agent of the Babcock & Wilcox Company, Barberton, Ohio, has resigned to become manager of the commercial end of the farms of O. C. Barber in that vicinity. He has been succeeded as purchasing agent by W. T. Shaler, who has been connected with the engineering department of the Babcock & Wilcox Company for some years.

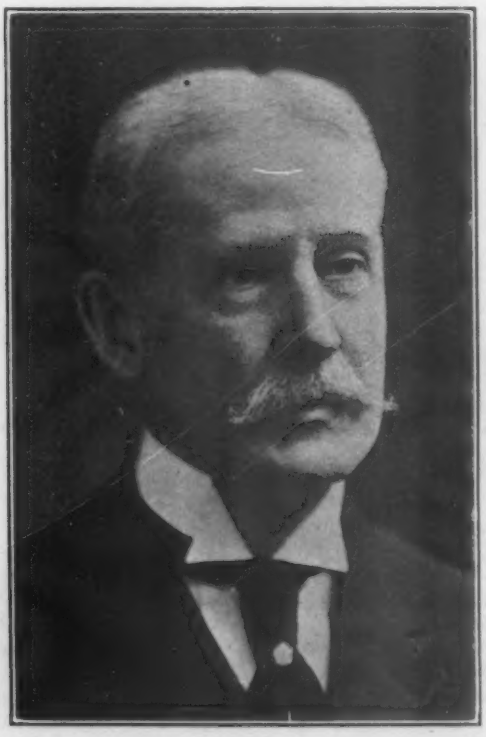
Following the resignation of Samuel Siddall as vice-president and treasurer of the Garry Iron & Steel Company, Niles, Ohio, J. Charles Wicks, formerly secretary and manager of sales, was elected president and manager of sales. George C. Johnson, formerly assistant manager of sales, was made secretary, and H. G. Long, formerly auditor of the company, was made treasurer.

W. M. Carpenter, formerly connected with the Marion Malleable Iron Works, Marion, Ind., has been made general manager of the Kuebler Foundries, Inc., Easton, Pa.

## Obituary

### John D. Culbertson

John Dickey Culbertson died at his home in Sewickley, a suburb of Pittsburgh, March 13, of pneumonia, after a short illness. He was 67 years of age, having been born in Wheeling, W. Va., in 1845. He began his business career in 1865 with Dewey, Vance & Co., Wheeling, manufacturers of iron cut nails. He was with that firm until it was reorganized as the Riverside Iron Works, when he was made treasurer, and remained in that position until the company was absorbed by the National Tube Company, about 1899. Becoming vice-president and treasurer of the tube company, he held that position until the time of his death. His knowledge of the business, coupled with his earnest application to his work, made him conspicuous in the manufacturing circles of the country. He established his home at Sewickley in 1901, when the National Tube Company moved its principal offices to Pittsburgh. He was a director of the First National Bank of Pittsburgh and was also a director of the Electric Power & Mfg. Company, of Spartansburg, S. C. He was a deeply religious man and took an active interest in philanthropic movements. He leaves a widow and two sons, John D., Jr., and T. W. Culbertson.



JOHN D. CULBERTSON

Prof. Henry W. Spangler, Whitney professor of dynamical engineering at the University of Pennsylvania, Philadelphia, Pa., died at his home in that city March 17, aged 54 years. He had been in ill health for more than two years. He was born in Carlisle, Pa., was graduated from the United States Naval Academy in 1878 and after three years' naval service became attached to the University of Pennsylvania. To Professor Spangler is largely due the high standard of excellence which the mechanical and electrical engineering departments of the university have attained. He was a member of many scientific organizations and the author of a number of standard works, among them one on "Valve Gears," which has run through two editions; another on "Notes on Thermodynamics," four editions; "Elements of Steam Engineering," two editions, and the co-author of "Graphics."

Rear Admiral George Wallace Melville, famous as an inventor, scientist and Arctic explorer, died in Philadelphia, Pa., March 17, of paralysis, aged 72 years. He retired from the navy in 1903. He served through the civil war, and was then sent out to various stations and navy yards. He volunteered for Arctic exploration, and distinguished himself with De Long's expedition in 1879, and as the rescuer of Greely's expedition five years later. He became engineer in chief of the navy in 1887, and was reappointed successively until his retirement. During this long period of service he was the supervisor of all the ships that were built, in number 120, representing 700,000 hp. His greatest success as a naval constructor was probably the triple-screw fliers, the Columbia and the Minneapolis.

A cablegram from its London office to the Bethlehem Steel Company announces the sudden death of Robert Olpp, at Kiel, Germany. He was foreman of machine shop No. 2, and was one of the company's most skilled mechanics. He was sent to Europe six months ago to superintend the installation of 48 four-in. guns on the 12 destroyers being built for the Argentine Republic in shipyards in England, France and Germany. The guns are being manufactured at the Bethlehem Steel Company's plant.

A. N. Verdin, Cincinnati, Ohio, president of the Verdin, Kappes & Verdin Company, died March 17, after a long illness, aged 62 years. He was born in Cincinnati, and at an early age entered the shop of his father, who acquired a reputation as a town clock builder. The son was known throughout the country as a mechanical engineer of unusual ability. His patented time lock for safes and vaults is familiar to builders of that class of equipment all over the world. In 1904 he established the machine and metal working shop of the company of which he was president at the time of his death. He leaves a widow, two sons and five daughters.

G. Genge Browning, president Belmont Iron Works, Philadelphia, Pa., died at his home at Devon, Pa., March 7, after a brief illness, aged 59 years. He had been president of the company for a considerable period.

Frederick K. Bonville, recently retired manager of the Crescent Nail Mills at Belleville, Ill., died last week, aged 71 years. He was born in New York.

Albert Gilbert, head of the A. Gilbert & Sons Foundry Company, St. Louis, Mo., died last week, aged 65 years. He was born in Kentucky.

At Seattle, Wash., March 19, all assets of the Western Steel Corporation were sold to the Metropolitan Trust Company of New York for $720,000, this being the amount of the company's claim for money loaned. This sale by the referee in bankruptcy marks the final chapter in the history of the corporation.

# A New Technical High School

## Features of the Jersey City Building and Its Shop Equipment—Continuous Sessions Planned

The recent publication in *The Iron Age* of a list of machine tools required to equip the machine shops of the new technical high school of Jersey City, N. J., directs attention to the important enterprise that city has under way to provide industrial training of a practical sort for its younger population and even for those who have passed what is ordinarily regarded as the school age. It is probable that when present plans are completed no public school system in the East will be superior to that of Jersey City in the matter of industrial schools which go further than mere manual training. The new technical school, which awaits but a few finishing touches and the installation of equipment, is an addition to the high school which was erected a few years ago at a cost of about $500,000. It stands at the corner of Newark and Palisade avenues on a commanding eminence from which a fine view is obtained of lower Jersey City and of New York. From New York's tall buildings the great high school building is conspicuous to those who look westward. It will house no less than 3000 pupils.

### Late Afternoon Classes

The guiding spirit in carrying out the plans of the Jersey City Board of Education in industrial training is Frank E. Mathewson, director of the technical and industrial department of the high school. Mr. Mathewson came from Wentworth Institute, Boston. Previously he was connected with the Cleveland, Ohio, Technical High School, and prior to that he helped to organize the Springfield, Mass., Technical High School. It is his desire to make the new school embrace the better features of all similar schools and have a scope larger than any. For instance, he plans to have a continuous session from the time the school opens in the early morning until the last student goes home at night; in other words, he wants early evening classes which would fill in the gap between the day period scholars and the regular night school hours. He hopes that employers will co-operate with the Board of Education and allow their younger employees, both male and female, to leave their work between 4 and 5 o'clock each afternoon. Such pupils would be supplied with a supper at nominal cost to them in the lunch room attached to the school, and after devoting about two hours to instruction in classes and in shop work could go to their homes and arrive in good season.

### Departments of the Technical School

The new portion of the high school which is to be devoted to industrial training cost about $500,000, making the entire structure represent an investment of about $1,000,000. In it is to be placed equipment costing about $150,000. There are in all 110 classrooms, 30 of which are to be devoted to technical work. The walls are light colored glazed brick. Among the rooms are the following, with approximate dimensions:

Four woodworking shops, 35 by 65 ft.
Forge shop, 30 by 60 ft.
Foundry, 40 by 60 ft.
Machine shop, 40 by 85 ft.
Elementary machine shop, 35 by 65 ft.
Four mechanical drawing rooms, 30 by 40 ft.
Three electrical and steam laboratories, averaging 30 by 45 ft.
Print shop, 35 x 35 ft.

### The Course for Boys

Attention is entirely confined in this description to what is being done for boys. As much is done along appropriate lines for girls. Of the course for boys the following is said in a circular issued by the Jersey City Board of Education:

In the course of instruction for boys the time during the first two years is practically evenly divided between shopwork and mechanical drawing and academic work, English, mathematics and science. Since the fundamental principles underlying all mechanical arts are identical, it is essential that during this time a more or less definitely prescribed outline of instruction be required. The shop work of these years follows a very general course, which includes woodworking, patternmaking, foundry practice, forging and machine work, the use and care of tools and machines, qualities of materials, their production and processes of preparation and their uses, together with an appreciation of and the application of fundamental principles of construction. All the work is planned to be educative and creative, as well as technically instructive. At the end of the second year if it becomes evident that the pupil has peculiar adaptability in any given direction he may, after consultation with the parent and director, be permitted to specialize in this particular line, so that upon graduation he may be better fitted for his life work. If he so chooses, he may devote as much as two-thirds of his time in school to his vocational work.

### The Shops and Their Equipment

The shops are all located on the first floor and what might be termed the semi-basement, running around the sides of the building, and all are lighted by unusually large windows near the ceilings. Arc lights furnish illumination at night. On the inner side of all the rooms is a balcony carrying hundreds of lockers and also providing room for visitors. In the foundry, which is of unusual height and entirely lined with white glazed tile, it is proposed to have the cores made in the balcony and lowered to the main floor by means of a small elevator. The foundry has a flooring of brick around the sides, giving a better footing to those doing small work at the benches. In the center of the room will be the regulation molding floor. In building the foundation walls provision was made for a regulation cupola and brass furnaces.

The other shops will have floors of tar concrete covered with 2-in. planking, and on that an oiled hard maple floor. The school has its own power plant, already installed, ample to meet all needs, consisting of three types of engines—McIntosh, Seymour & Co., Harrisburg straight line and Curtiss turbine—all direct-connected with General Electric generators. In case of breakdown there are facilities for taking current from the public service mains. All the machinery in the shops will be operated electrically.

### Courses of Study

The following indicates the course of study, each academic branch of which is taught in 50-minute periods. Shop work is taught in longer periods. Pupils must give in the aggregate 35 hours a week to their studies:

First year—English, mathematics, industrial geography and history, civics, elementary science, mechanical drawing and shop work.

Second year—English, industrial economics, mathematics, physics, applied mathematics, mechanics, mechanical drawing and shop work.

Third year—English chemistry, industrial economics, American history-civics, drawing and shop work (elective).

Fourth year—Advanced mathematics or shop work; advanced science or shop work, industrial economics, civics, English, shop work and drawing (elective).

Two hundred pupils already are enrolled in the technical school and it is expected to have them at work in the shops this spring. When the boys are far enough advanced in training it is planned to have them build at least some of the machines and equipment for similar schools which may be established in other parts of the city, as has been done in existing trade schools.

## Machine Tool Builders' Date Fixed

The National Machine Tool Builders' Association will hold its annual convention at the Chalfonte Hotel, Atlantic City, N. J., on Thursday and Friday, May 16 and 17, according to advices received from Charles E. Hildreth, secretary, Worcester, Mass.

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The New York section of the American Institute of Mining Engineers will hold a meeting on the evening of March 26 at the Engineering Societies Building, 29 West Thirty-ninth street, New York, at which Prof. James F. Kemp will present an illustrated lecture on "Iron Mines in Swedish Lapland." The April meeting of the section will be held on the evening of April 12, at which Dr. Carlton Ellis will deliver an illustrated lecture on "Flameless Combustion," which is a process now attracting much attention in the metallurgical field.

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The Perkins Machine Company, Warren, Mass., shipped 10,300 lb. of presses March 13 by express to the Quaker Oats Company, Cedar Rapids, Iowa. This is the second shipment made by express of such an unusually heavy weight to the same buyer.

## Pittsburgh and Vicinity Business Notes

The Whitaker-Glessner Company, Wheeling, W. Va., has been making some improvements and repairs to its plant at Martins Ferry, Ohio, which resumed operations March 18, having been closed since January 1. The improvements included the rebuilding of the mill engines and furnaces and the installing of additional boiler capacity. The Wheeling plant has been in operation steadily to nearly full capacity, but at this works additional boiler equipment has also been installed for the purpose of economizing operating conditions. The two coal mines of the company have been equipped with electrical machinery, and three electric cranes have also been added to its two mills at Wheeling and Martins Ferry.

The Keystone Tube Works, Inc., Connellsville, Pa., is installing the necessary equipment for making square tubing. The new department will be ready for operation shortly after April 1.

Boyts, Porter & Co., Connellsville, Pa., builders of coal mining equipment, are planning an extension to their mining machinery department, if the town authorities agree to vacate an unused street adjoining the property.

At the annual meeting of the Ohio File Renewing Company, Niles, Ohio, held last week, W. F. Thomas was elected president and treasurer; H. A. Hofmaster, vice-president, and E. A. Wilson, secretary.

J. J. O'Connor, secretary of the Association of Sheet and Tin Plate Manufacturers, has called a meeting of the organization to be held in the Fort Pitt Hotel, Pittsburgh, on Friday, March 22.

The Westinghouse Air Brake Company has posted notices in its shops at Wilmerding, Pa., increasing the working hours to 10 hours a day and five days a week. This is an increase of two hours a day.

The Southern Pacific Railroad has placed an order with the Westinghouse Electric & Mfg. Company, East Pittsburgh, for six high power electric locomotives, each of 1000 hp., and operating on the direct-current system with 1200-volt current, and has also placed contracts for 20 special car equipments for the electric zone of this line, which operates both individual cars and locomotives at its Western terminals. Each of the locomotives included in this order will have a Baldwin frame.

The Standard Plate Glass Company, Pittsburgh, has placed a contract for the building of a large machine shop at Butler, Pa., for which considerable equipment will be required.

The plant of the Washington Tin Plate Company, Washington, Pa., which has been completely remodeled and rebuilt under plans of S. Diescher & Son, consulting engineers, Farmers' Bank Building, Pittsburgh, was put in operation March 18, after being shut down for some months.

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What promises to be an exceedingly important precedent established by the Government, being substantially the fixing of prices for a given industry, is the reported decision of the United States Circuit Court of Ohio instructing the General Electric Company as to the prices at which it shall sell electric lamps. The order is an outcome of the Government's suit for the dissolution of the so-called electric lamp pool, which suit simmered down to a determination of the validity of maintaining a resale price. In adjusting the suit on what appears to be a joint application of the Attorney General and the defendants, the question was left under court jurisdiction, and while the opportunity has not yet presented itself for verifying the fact, it is reported that the court has actually fixed a price which is a slight reduction of the prevailing price.

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The following contractors have been awarded work in connection with the cut-off west of Scranton planned by the Delaware, Lackawanna & Western Railroad, a large undertaking, including, it is understood, a bridge of steel or reinforced concrete, 3000 ft. long: Walter H. Gahagan, Brooklyn, N. Y.; F. N. Talbot, New York City; Waltz & Reece, Netcong, N. J.; Timothy Burke, Scranton, Pa.; Patricius McManus, Philadelphia, Pa.; Hyde, McFarlin, Burke Company, New York City; David W. Flickurr, Roanoke, Va.; Jas. A. Hart Company, New York City; Reiter, Curtis & Hill, Philadelphia, Pa.; Robert Grace Construction Company, Cleveland, Ohio.

## New Publication

**National Iron and Steel, Coal and Coke Blue Book.**—A directory of firms, corporations and individuals engaged in the production of iron and steel, coal and coke, in the United States, Canada and Mexico; the plants or mines operated, their location, description, equipment, etc. Cloth; pages, 1196. R. L. Polk & Co., 1331 Fifth avenue, Pittsburgh, Pa. Price, $10.

This is the fourth edition of a book which has been found of much value by consumers of iron, steel, coal and coke. The publishers state that all the information given is gathered from original sources for the purpose of making it authentic. They have aimed to give a correct, though brief, resume of data for each individual copartnership or corporation engaged in the branches of industry covered. The names of the works and furnaces of large companies are given in such a manner that cross references indicate where the details are to be found. The scheme of the work, in addition to giving details regarding each iron or steel plant, includes the grouping of manufacturers according to the general character of their output, such as Bessemer steel works, crucible steel works, open-hearth steel works, steel casting works, blast furnaces, merchant bar mills, plate mills, rail mills, sheet mills, skelp mills, tin and terne plate mills, structural steel mills and malleable casting works. In addition to officers, the names of purchasing and sales agents are given. A feature of the publication is a general business directory of the leading firms engaged in the manufacture and sale of goods pertaining to the allied trades of iron, steel, coal and coke, classified with reference to business, the names being arranged under each heading alphabetically by post offices.

## No Renewal of Canadian Steel Bounties

TORONTO, March 15, 1912.—The budget speech of the Canadian Finance Minister, delivered on Wednesday, contained no announcements of changes in duties or steel bounty renewal. The minister said that there had been many requests for changes and he admitted that much could be said in their favor, but that he considered there was no case of urgency and all tariff questions could well remain in abeyance until the Tariff Commission had made investigations. There was much disappointment at the absence of provisions for renewing the bounties. It is improbable that they will ever be restored, for the feeling of the farming population against them is very strong.

It is probable that any assistance the steel industry of Canada may receive when action is taken upon the Tariff Commission's report will be in the form of a new arrangement of customs duties, for it would be unpopular and would seem reactionary to return to the bounty plan.

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The Zanesville plant of the American Rolling Mill Company, Middletown, Ohio, which contains six hot sheet mills, has been started up in the manufacture of terne plate, using as a base American ingot iron, which is produced at Middletown and shipped to Zanesville. Considerable new equipment has been installed in the Zanesville plant, consisting of pickling and tinning machinery, three stands of cold rolls, shears, etc. The plant had been idle for about three months.

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The initial steel plant to be built by the Brier Hill Steel Company, Youngstown, Ohio, will contain eight 75-ton open-hearth furnaces, which will give the company a daily output of about 1200 tons of steel ingots. The plant will be laid out to accommodate six more furnaces, as it is the company's intention to reach a daily capacity of 2000 tons. The plans are now being prepared by Julian Kennedy, Bessemer Building, Pittsburgh.

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The wages of puddlers in mills governed by the Amalgamated Association scale will be on the basis of $5.37½ a ton for March and April, being a reduction of 12½ cents a ton over prices for puddling paid in January and February. The regular bi-monthly settlement of the puddling scale was made in Youngstown, Ohio, last week and the card rate for bar iron sales was reduced from 1.20 cents to 1.15 cents, which carried the wage reduction as stated.

## The American Radiator Company

### Annual Report for Year Ended January 31, 1912

The thirteenth annual report of the American Radiator Company, covering the year ended January 31, 1912, presents the following income account, as compared with the previous year:

| | 1911-12. | 1910-11. |
|---|---|---|
| Net profits | $1,312,052.49 | $1,772,517.43* |
| Preferred dividends | 210,000.00 | 210,000.00 |
| Balance | $1,102,052.49 | $1,562,517.43 |
| Common dividends | 615,000.00 | 569,000.00 |
| Surplus | $487,052.49 | $993,517.43 |
| Previous surplus | 5,520,167.39 | 4,526,649.96 |
| Total surplus | $6,007,219.88 | $5,520,167.39 |

*Includes $575,000 from the sale of common stock to stockholders.

The balance sheet as of January 31 presents the following comparison:

| *Assets.* | 1911-12. | 1910-11. |
|---|---|---|
| Real estate, plants, machinery, patents, etc. | $9,837,761.80 | $8,693,179.94 |
| Additions during year | 161,597.38 | 1,344,581.86 |
| Total | $9,999,359.18 | $10,037,761.80 |
| Less depreciation | 300,000.00 | 200,000.00 |
| Net | $9,699,359.18 | $9,837,761.80 |
| Cash | $1,607,120.79 | $1,115,058.47 |
| Notes receivable | 286,971.54 | 111,395.81 |
| Accounts receivable | 2,401,603.54 | 1,911,725.68 |
| Raw material, supplies and finished products | 1,490,576.83 | 2,030,270.43 |
| Total quick assets | $5,786,272.70 | $5,168,450.39 |
| Total assets | $15,485,631.88 | $15,006,212.19 |
| *Liabilities.* | | |
| Capital stock, preferred | $3,000,000.00 | $3,000,000.00 |
| Capital stock, common | 6,150,000.00 | 6,150,000.00 |
| Accounts and bills payable | 328,412.00 | 336,044.80 |
| Surplus | 6,007,219.88 | 5,520,167.39 |
| Total liabilities | $15,485,631.88 | $15,006,212.19 |

From the accompanying remarks of President Clarence M. Woolley the following extracts are taken:

For many years after the organization of the company no dividends were paid on the common stock, the holders thereof approving of the policy of conservation until such time as the profits thus reserved would enable the company to be placed in a strong financial position. The board of directors at it last meeting, believing the time had arrived when a moderate portion of the reserved profits could be distributed to the holders of the common stock, without prejudice to the maintenance of existing financial policies, declared a 10 per cent dividend payable in the common stock of the company March 30 next.

The year just closed has been one of moderate business depression, but the number of new buildings constructed throughout the country during 1911 was greater than the preceding year. Due to this condition a larger volume of new business was available for this line of industry.

During the year the company has continued to make progress in the refinement of manufacturing methods, and in the further enlargement of producing capacity. Signal progress has again been made in the improvement of selling and distributing methods. The efficiency of material property and individual effort has been enhanced.

The European business of the company continues to prosper. The German company has had a successful year. The volume of business and the net profits were in excess of the preceding year. It has two factories, one at Schoenebeck on the River Elbe, to supply the eastern part of that country, and one at Neuss on the River Rhine, the western section. The latter plant was enlarged during the year. The French company, with its plant at Dole, has increased the volume of business and profits during the past year. The English company has likewise experienced a year of growth in volume and in net profits. It provided a substantial increase in producing capacity by the enlargement of the works at Hull, from which point excellent shipping facilities are available for the trade it serves in Great Britain, The Netherlands, Scandinavia, South America, Africa and the Orient. The Italian company, with its plant at Brescia, which was completed last year, is in successful operation. Consistent earnings have been realized during the year. The outlook for business in Italy is gratifying. During the year a company was organized in Austria and contracts let for the construction of a factory at Wiener-Neustadt, 30 miles from Vienna. This factory will be ready for operation early in 1913.

The general management of the European companies is conducted from an executive office in Paris, where a new building is being constructed to serve as headquarters for the French company and as general offices for the officials of the several companies in Europe. This building will be ready for occupancy during the coming summer. The European companies are owned in total by this company. The original investment only is included in the real estate and plant item in the financial statement herewith presented. No dividends have been declared by these companies, the profits having been utilized for extensions to their business. Such income therefore is not included in the balance sheet of this company.

## The Bridge Builders' Society

The regular monthly meeting of the Bridge Builders' Society was held in the Fort Pitt Hotel, Pittsburgh, March 7 and 8. C. D. Marshall of the McClintic-Marshall Construction Company presided and George E. Gifford of the Jope-Gifford Company was secretary.

The attendance was large and matters of considerable interest to the members were discussed. Chief of these is the question of the open lettings of contracts which the society is trying to accomplish. Government and municipal work is placed by open lettings, but this is not the case with bridge and other work, on which lower prices are often made on the solicitation of the builder or architect after the regular bids have been submitted.

The society has prepared a standard specification for bridge work which has been sent to all the members for approval through a committee, and it will likely be formally adopted at the next meeting. It has also taken up safety work and has recommended the placing of cages over gear and flywheels, goggles for men working on emery wheels and compulsory insurance, such as is in force in laws of Ohio and other States.

The members of this society are as follows: New England Structural Company, Boston, Mass.; Lackawanna Bridge Company, Buffalo, N. Y.; Chicago Bridge & Iron Works, Chicago, Ill.; Pennsylvania Steel Company, Steelton, Pa.; Phoenix Bridge Company, Phoenixville, Pa.; Louis F. Shoemaker Company, Philadelphia, Pa.; Virginia Bridge & Iron Works, Roanoke, Va.; McClintic-Marshall Construction Company, Pittsburgh; Fort Pitt Bridge Works, Pittsburgh; King Bridge Company, Cleveland, Ohio; Riter-Conley Mfg. Company, Pittsburgh; Toledo Bridge Construction Company, Toledo, Ohio; Boston Bridge Works, Boston, Mass.; Worden-Allen Company, Milwaukee, Wis.; Levering & Garrigues Company, New York City; Jones & Laughlin Steel Company, Pittsburgh; Noelke-Richards Iron Works, Indianapolis, Ind.; Riverside Bridge Company, Martins Ferry, Ohio; Cambria Steel Company, Johnstown, Pa.; Minnesota Steel & Machinery Company, Minneapolis, Minn.; Kansas Structural Steel Company, Kansas City, Mo.; Wisconsin Bridge & Iron Company, Milwaukee, Wis.

C. D. Marshall, McClintic-Marshall Construction Company, is president; J. V. W. Reynders, vice-president Pennsylvania Steel Company, is vice-president; George E. Gifford, Jope-Gifford Company, is secretary, and Harry Fuller, chief engineer King Bridge Company, is treasurer. The next meeting of the society will be held in New York City April 11 and 12.

The Pennsylvania Railroad has issued orders in the past 30 days for the construction of 94 locomotives at its Juniata Shops, against its 1912 programme. The latest orders came out last week, when 52 were listed, which are divided among passenger, freight and shifting engines. It has also ordered the construction of 35 all-steel cattle cars at Altoona. These are to be of new design, and will be for use on the lines west of Pittsburgh.

The Morgan Construction Company, Worcester, Mass., has received the contract from the Atlanta Steel Company, Atlanta, Ga., for a continuous billet mill to make small billets, different sizes of merchant bars, sheet bars and plow steel of different widths and thicknesses.

# The Machinery Markets

In nearly all sections of the country the machinery trade is feeling a hesitancy on the part of prospective buyers to place orders. That economies are being practiced is further shown by the good demand there has been for second hand machines. At the same time general conditions appear to warrant greater activity than exists and the trade is hopeful. Uncertainty of action and the tendency to proceed slowly seem to be inspired by threatened labor troubles in the coal fields and to some extent by the political situation. In New York there has been a little fairly good business in the last week, but for the most part demands were scattered and did not involve big figures. A little betterment in small sales is noted in Philadelphia, with hesitancy in closing on big propositions. New England is optimistic because of a general improvement. Inquiries have been fairly active in Chicago although closing is done cautiously, many of the sales being for second hand tools. Cleveland activity has been largely confined to single tools with some improvement in business. A hopeful feeling pervades Cincinnati and the export business keeps up well. Detroit has had demand for small tools from the automobile industry and a fairly good call for second hand tools. St. Louis conditions are generally quiet. Unseasonable weather is the cause of irregular business in the South, although inquiries are plentiful. Texas had a good call for equipment for the oil fields. The Pacific coast has received its best demands from the lumber industry and the canneries of Oregon. Mexico is practically out of the market because of her political troubles.

## New York

NEW YORK, March 20, 1912.

The greater part of the buying in the New York machinery market in the last week continued to be of a scattered character with few sales notable for size. Some of the good news of the week is that orders have been practically placed on a portion of the large list of machine tools required by the Jersey City Technical High School; that a fair sized group of machine tools was purchased by the National Foundry Company of Brooklyn, N. Y., and some orders have been placed by the International Typesetting Machine Company, Brooklyn, for its temporary shops. There also came to light plans for establishing a few new manufacturing plants in and near New York. As a whole the week has been a quiet one as regards sales of machine tools, and the extent to which economy is being pursued is indicated by a strong demand for second hand tools. Price cutting with the granting of other concessions is a cause of more or less dissatisfaction in the trade. Outdoor equipment is in rather good demand because of the big undertakings which contractors have on hand. Dealers in sugar making machinery are commencing to receive the usual spring call for their products. Despite the good prospects of the first of the year there is not a satisfactory amount of replacement by the railroads whose purchasing agents continue to deliberate long before placing business. March so far is behind the same period of a year ago. The failure of Wyckoff, Church & Partridge, Inc., manufacturers of and dealers in automobiles, was a disappointment to the trade not only because it removed a customer, at least temporarily from the field, but it caused the cancellation of orders already placed and on which delivery was about to be made.

The new plant which the Midland Linseed Products Company, Minneapolis, Minn., is erecting at Edgewater, N. J., is rapidly nearing completion and will soon be ready for its equipment. A complete line of flaxseed working machinery will be required, together with power plant and conveying machinery. It is understood that purchases are now being made. The company is a Minnesota corporation and operates mills at Minneapolis and Chicago, Ill.

The Paper Working Machines Company, 59 West Tenth street, New York, has leased a part of the old Chrome Steel Works, Kent avenue and Hooper street, Brooklyn. After some alterations, including the installation of a 100-hp. steam plant, the company will move its equipment from New York.

A new plant for the Tide Water Paper Mill Company at the Bush Terminal, Brooklyn, is practically completed and the installation of machinery has begun. The company will manufacture about 100 tons of newspaper per day and its output will begin this spring.

The Federal Sugar Refining Company, Yonkers, N. Y., has let a contract to Lynch & Larkin of that city for the erection of a one-story brick and steel addition, 60 x 100 ft., to be made to its plant, to cost $30,000.

M. Welte & Sons, Inc., has been incorporated at Freeport, N. Y., with a capital stock of $1,000,000 by A. W. Varian, F. N. Gilbert and F. W. Jackson, New York City. A plant is to be established for the manufacture of musical instruments.

Plans are being prepared for a water supply system at Sodus, N. Y., which will include a pumping plant and distribution reservoir; also several miles of pipe line. H. C. Kittredge, German Insurance Building, Rochester, N. Y., is the engineer in charge.

The American Knife Company, Baldwinsville, N. Y., has been incorporated with a capital stock of $30,000 and will engage in the manufacture of knives, edged tools, etc. The incorporators are A. J. Tooley, Baldwinsville; J. H. Mather, Syracuse, and J. H. Nichols, Greenfield, Mass.

The Central New York Engineering & Equipment Company, Geneva, N. Y., has been incorporated by J. H. Sharpe, Geneva, and F. and M. H. Bowers, Penn Yan, N. Y., to manufacture electrical and mechanical engines. A plant will be arranged for. The capital stock of the company is $100,000.

Plans are being completed by the A. L. Swett Iron Works, Medina, N. Y., for the erection of a new foundry building having about 35,000 sq. ft. of floor space. Traveling and jib cranes will be installed; also a 64-in. cupola, new core ovens and equipment. Later the company contemplates erecting a new building for tumbling purposes, for which new equipment will be provided, including sand blast and exhaust system.

The Clark Paper & Paper Pulp Mfg. Company, 88 Mills street, Rochester, N. Y., is having plans prepared for a factory and warehouse which it will erect and equip this spring.

The Jefferson Company, Watertown, N. Y., has been incorporated with a capital stock of $100,000 and will build a plant for the manufacture of paper, paper pulp, etc. D. M. Anderson, G. C. Sherman, G. W. Knowlton and F. L. Carlisle of Watertown are the incorporators.

The Quaint Art Furniture Company, Syracuse, N. Y., is having plans prepared for a three story and basement factory building 100 x 300 ft., fireproof construction, which it will build this summer.

The Niagara Falls Linen Company has completed plans for a factory building to be erected at James and Jefferson streets, which it will equip with 100 looms.

The Kendall Refining Company will add to its distributing plant, Rapin avenue and the Erie Railroad, Buffalo, a one-story brick compounding and storage building.

The American Tool Handle Company, Buffalo, N. Y., has been incorporated with a capital stock of $75,000 and will establish a plant for the manufacture of wirebound tool handles. The incorporators are Edward J. and George C. Renkenberger and Edward L. Jung.

The Swiss Magneto Company, now located in Chicago, has arranged to move its plant to Buffalo, and has been incorporated under the laws of the State of New York with a capital stock of $250,000. The directors are B. H. Phillips and E. C. Schlenker, Buffalo, and H. S. Martin, Dunkirk, N. Y., who will be the vice-president and sales manager of the company.

The Western New York Water Company, Buffalo, which is building a new pumping station and filtration plant at Niagara Falls, has decided to equip the plant with electrically driven pumps of the latest type instead of installing the pumps from the old pumping station as was first intended.

The Linde Air Products Company, Buffalo, has com-

pleted plans for an addition to be made to its plant on Chandler and Grote streets, 62 x 82 ft., of brick and steel construction.

The Buffalo Sled Company has let a contract for the construction of a new factory building, 65 x 300 ft., three stories and basement, to be added to its plant at North Tonawanda to the Durolithic Company, 460 Ellicott square, Buffalo, N. Y. The building will be of concrete and steel construction.

## New England

BOSTON, MASS., March 19, 1912.

The machine tool builders report an increasing business, and orders booked by the dealers reflect this condition. The reports from the automobile manufacturers are most encouraging, the season's promise being a business at least as good as last year, and probably better, especially with the makers of trucks.

An improvement in business is noted pretty generally. No doubt exists that the last fortnight has seen a change. This is true in a great many lines of business. The large machine tool plants have felt felt the difference. Business is certainly better than it was a year ago. Manufacturers do not look for any immediate unusual gain on their order books, but they see a beginning of the end of the dull times. Inquiry made of representative houses in all lines of metal products indicate that such is the case.

The Becker Milling Machine Company, Hyde Park, Mass., has plans prepared for an addition to its shops which will give 25,000 sq. ft. of manufacturing space. A new power plant is in process of erection, which will develop 500 kw. The company finds business improving, last month being the largest in three years. Work on the shop addition will not begin before the last of the year.

The Pope Mfg. Company, Hartford, Conn., will erect an additional factory building, 70 x 193 ft., four stories, of reinforced concrete.

The New Britain Machine Company, New Britain, Conn., will largely increase its plant. The one-story building, 56 x 140 ft., erected last fall, will be raised three stories and an entirely new building will be constructed, 56 x 160 ft. and four stories. In addition a one-story building, 36 x 86 ft., will be provided for storage.

It is announced in Pawtucket, R. I., that Edwin A. Smith, Providence, has purchased the Pawtucket Foundry Company's property and will occupy it as the Champion Horse Shoe Company, to manufacture horseshoes.

The Fowler Nail Company, Seymour, Conn., is planning to extend its manufacturing facilities this season by the addition of new machinery. The company's business has been exceptionally good, requiring that the plant operate until 9 o'clock at night.

The Veeder Mfg. Company, Hartford, Conn., is increasing its manufacturing capacity about 100 per cent. A new building is about completed and machinery is being purchased.

The Stevens-Duryea Company, Chicopee Falls, Mass., has let the contract for the new factory building which will be erected at East Springfield, Mass. The structure, the first of a group, will be 80 x 508 ft., four stories. It is understood that it will be devoted to the manufacture of automobile bodies.

Additions to general manufacturing plants in New England include the following: Hemenway & Bartlett Silk Company, Watertown, Conn., addition 40 x 80 ft. two stories and an office building. Henry Weyand Company, Inc., Waterbury, Conn., addition, 40 x 80 ft. and three stories and other improvements.

The business of the Union Caliper Company, Orange, Mass., has been reorganized. Hartley R. Walker and Harold R. Walker have bought one-half interest in the business from Miss Nettie D. Johnson. E. E. Ellis is the president and superintendent, Hartley R. Walker, treasurer, and Harold R. Walker, secretary and clerk. The company manufactures calipers and other machinists' tools. The business was originally located in Fitchburg and was moved to Orange a year ago, since which time it has prospered.

The Sessions Foundry Company, Bristol, Conn., whose plant was damaged by fire March 15, states that the loss was confined to the smaller of its pattern storage buildings and only a small part of its patterns were destroyed. The plant will continue in operation without interruption and the building will be replaced immediately with a larger and fireproof structure.

## Philadelphia

PHILADELPHIA, PA., March 19, 1912.

A spotty betterment in the demand for some of the smaller machine tools has been noted but a hesitancy is apparent in the closing of any large or important contracts. Expected lists for several moderate general equipment requirements, previously noted, have not yet developed, although it is understood that some quiet buying has already been done by several concerns which are making additions to their plants. The local locomotive builder has taken on considerable new business since the first of the month, and is now $3,000,000 better off in volume of orders than on January 1. Considerable business in electric traveling cranes is still under negotiation. New requirements from the local railroads continue light.

The probability of a coal miners' strike is retarding business in the coal fields and also causing some hesitancy in the conduct of general business.

Somewhat better buying of equipment on the part of the railroads some time ago is now being felt by the steel casting plants which are more actively engaged. Gray iron foundries, however, report little change in operating conditions.

The second-hand machinery and equipment market has not been very active, although betterment is reported in some lines. There is a fair demand for general power equipment.

The Pennsylvania Railroad has had inquiries out for one or two 25-ton gantry cranes for delivery at Rochester, N. Y.

An Eastern manufacturer is inquiring for a 10 to 15-kw. direct connected unit, 125 volts, either Westinghouse or General Electric preferred generator. Full particulars as to price, condition and where it can be inspected are asked. Address Box 306, care *The Iron Age*, Philadelphia, Pa.

The A. H. Fox Gun Company was adjudged a bankrupt in the United States District Court in this city last week. Spencer K. Lewis, who was appointed receiver, states that at this time it is undecided as to whether the plant will be continued in operation or not.

The Atlantic Radiator Company, Philadelphia, Pa., has closed its foundry temporarily to enable it to make repairs, extensive improvements and enlargements to its buildings and equipment. Bids are being taken for a core room, 60 x 80 ft., with necessary equipment, a new testing plant and an electric elevator for the cupola. The company also contemplates the erection of a tramway or industrial railway to connect its various departments.

The Easton Tool & Machine Company, Easton, Pa., has acquired an adjoining building, two stories, 25 x 200 ft., which it will use for storage and warehouse purposes. This will enable it to use more floor space in its present plant for manufacturing purposes, for which it is proposed to purchase an 18-in. lathe and additional grinding machinery. The intended improvements will increase the capacity of the plant fully 50 per cent. This company has been quite busy, particularly in its pattern and special tool departments. It reports a very good export trade in sectional jaw and other types of vises.

The Link Machinery Company, Williamsport, Pa., whose plant was recently destroyed by fire, advises that it is not its intention to rebuild the plant.

The H. A. May Foundry Company, Thirtieth and Chestnut streets, recently incorporated under Pennsylvania laws, with a capital stock of $50,000, has taken over the business of H. A. May, trading as the Empire Foundry Company. H. A. May is president; M. F. Carr, vice-president, and W. A. Pees, secretary and treasurer. Some betterment in the plant is under consideration, but nothing definite has yet been decided upon.

The Howard Iron & Tool Company, Howard, Pa., advises that it will not, as has been reported, remove its plant to Williamsport at this time.

The Atlas Ball Company has been incorporated under Pennsylvania laws with a nominal capital stock of $10,000. The company, which some time ago removed from Merchantville, N. J., to this city, has been operating under a New Jersey charter. Otto W. Schaum is president; P. J. Heller, vice-president, and O. B. Fletcher, secretary-treasurer. The concern will ultimately increase its manufacturing facilities to a large extent.

Ballinger & Perott, engineers, are taking estimates for a two-story addition, to be erected for the Ester-

brook Pen Company, Camden, N. J. The building will be of slow-burning construction type, 40 x 80 ft.

The Edward Renneburg & Sons Company, Baltimore, Md., machine and boiler maker, has purchased the plant formerly operated by George H. Chipmen, on Boston street, in that city, and will use it in conjunction with its plant on Aliceanna street.

Bureau Brothers have sold their bronze foundry plant at Twenty-first street and Allegheny avenue, and are having plans prepared for a new plant, including foundry, office and other buildings, to be erected at Twenty-third and Westmoreland streets. The buildings will be much larger than those formerly occupied, and will be equipped with modern foundry appliances.

The William Cramp Ship & Engine Building Company is considering the erection of a large addition to its present machine shop. Details as to the proposed improvement are not available at the time.

The Maryland Mold & Foundry Company, Cumberland, Maryland, has been incorporated and has taken over the business of the Potomac Mold & Machine Company and the Maryland Foundry Company. The equipment of the former concern has been removed to the plant of the latter. The company makes all kinds of gray iron castings. It also makes a specialty of glass house molds, rough finished or in special blanks. I. W. Holmes is president and H. W. Fielding, treasurer and manager of the new corporation.

The Baldwin Locomotive Works has taken orders for 130 locomotives of various types since the first of the month. During the past week orders were booked for 70 engines for the Atchison, Topeka & Santa Fé, five for the Great Western, six for the Norfolk & Western and four for the Louisiana & Arkansas. Ten are also to be built for the Western Maryland. The plant is still operating on a very restricted basis, employing about 7500 men, but this force will probably be increased as the new work comes from the drafting room, which will be in about one month. The company now has orders on its books to the value of $3,000,000 more than at the first of the year. A number of good inquiries are being figured on and further business is in sight. It is proceeding with plans for its new shops in the vicinity of Chicago, but will probably not be ready to make any equipment purchases until next fall.

The Mohton Planing Mill Company, Mohton, Pa., has been incorporated with $10,000 capital stock to operate a planing mill. The company is having plans prepared for the erection of a factory building and is now in the market for quotations on necessary equipment. The incorporators are William E. Fisher, John W. Spangyer and John B. Stevens.

Binder Bros., Emaus, Pa., will erect a shoe factory on North street, that city, and are now ready to receive bids for its equipment.

Callahan & Meyers, Allentown, Pa., silk manufacturers, have leased premises and desire bids on the necessary machinery. Bids should be made at once as they wish to begin manufacturing as soon as possible.

## Chicago

CHICAGO, ILL., March 19, 1912.

The sale of the equipment of the Sterling Vehicle Company, Harvey, Ill., at auction the past week contributed toward the comparative lack of sales of new machines. The equipment sold included 14 lathes, eight radial and upright drills, three milling machines, one planer, one boring and facing mill, two shapers, one Norton universal grinder, one power hammer, one bulldozer, and other miscellaneous machinery. A similar sale involving the equipment of the American Electric Fuse Company at Muskegon is scheduled for the near future. The Oshkosh Mfg. Company, Oshkosh, Wis., is in the market for a 14 or 16-in. lathe and a 40-in. open-side planer, on which purchase they desire to trade in a 24 x 24-in. x 6-ft. planer. General inquiry has been fairly active although in some cases the business is slow in closing. Among the separate orders noted are a 60-in. heavy pattern radial drill, five vertical turret lathes, placed on five different orders, and several small tools for railroad service. It is understood that the buying of tools on the Wabash list has not yet been completed.

A. J. Geary, Chicago, has let the contract for the erection of a one-story brick shop 40 x 90 ft., at 9309 Erie avenue, the cost of which is placed at $4,000.

J. C. Brown, Chicago, has taken out a permit providing for the erection of a one-story brick factory 75 x 98 ft., to be located at 600 South Paulina street, and to cost $15,000.

The Kersten Company, Chicago, has been organized with an authorized capital stock of $30,000, to manufacture brass goods, the incorporators being Chas. E. Kersten, Wm. A. Kersten and Francis H. Hammett.

The Sprague Iron Works, Chicago, has been organized, with a capital stock of $5,000, to engage in the manufacture of metal products by E. S. Sprague, J. T. Larson and J. C. Sprague.

The Modern Stove Company, Chicago Heights, Ill., has been incorporated with a capital stock of $125,000 by J. R. Hobrecker, Wm. Broeck and Geo. A. Brinkman.

The By-Product Coke Corporation, Chicago, has announced the proposed erection of 40 additional Solvay coke ovens at its South Deering plant. Pickands, Brown & Co., Chicago, are the selling agents for this company.

The Contractors' Tools Supplies Company, Sycamore, Ill., has been organized to manufacture tools and supplies, the incorporators being Frederick B. Townsend, Geo. A. Peter and L. C. Shaffer.

The Wills Mfg. Company, Mendota, Ill., has been organized with a capital stock of $10,000 by E. B. Wills, George Niebergall and John Bomgartner. The company will manufacture heaters and tanks, and property has been purchased upon which to erect a plant.

The Burr Foundry Company, Urbana, Ill., is preparing plans for the building of a foundry and power plant at an estimated cost of $75,000.

The Black Hawk Mfg. Company, Waterloo, Iowa, which will do a general foundry and machinery business, has been incorporated with a capital stock of $10,000. E. J. Brady is president, H. B. Lichty, vice-president and treasurer, and G. H. Andrews, secretary.

The Minneapolis Steel & Machinery Company, Minneapolis, Minn., is building an addition to its plant involving an expenditure of $50,000.

## Cincinnati

CINCINNATI, OHIO, March 19, 1912.

There is a more hopeful feeling in all lines of business, although many manufacturers feel somewhat apprehensive over the threatened coal miners strike. Should the railroads be crippled to any appreciable extent, the buying of machine tools, of which many of them are in great need, will be still further delayed. The export business is holding up well, and while the South is not considered a very good market for machine tools, inquiries from that section are more numerous, although they mainly call for single tools.

The extremely high prices asked for foundry coke have not seriously inconvenienced many local foundries, as they were nearly all covered with contracts, but there is much complaint over railroad delays.

The Ohio Knife Company, Cincinnati, whose factory is located at Ninth and McLean avenues, is seeking larger quarters. The company manufactures all kinds of machine knives, and while no definite decision has been made it is generally understood that it will erect a building of its own if a suitable site can be secured in Cincinnati.

In order to continue the Globe Iron Works Company, Dayton, Ohio, as a going concern, its creditors and owners mutually agreed to appoint R. R. Dickey, a former president of the company, as receiver to, handle the company's affairs. It is generally understood that the company will soon be free from its present difficulties.

It is now officially denied that the Baldwin Locomotive Works will build a branch factory at Cincinnati, as has been currently reported. It is understood that a site farther West was desired, and that East Chicago, Ill., will get the new plant.

W. N. Holston, Mt. Vernon, Ohio, has the contract for building a sewage disposal plant, to cost about $50,000. The secretary of the Public Service Board, Mt. Vernon, is able to give required information.

Work on the addition to the Wheeling Mold & Foundry Company, Wheeling, W. Va., is now well under way. The new building will be of steel construction, 200 x 300 ft. In the list of equipment to be installed is a large electric crane for handling heavy castings.

The Foos Gas Engine Company, Springfield, Ohio, has increased its capital stock from $160,000 to $200,000. Nothing has yet been given out as to any contemplated additions to the company's plant.

The Clifton Pratt Company, Cincinnati, has been recently incorporated with $10,000 capital stock, to

manufacture pumps, vacuum cleaners and machinery specialties. Nothing is yet known as to the manufacturing plans of the company. A. E. Clifton and Charles R. Pratt are named among the principal incorporators.

An additional pattern storage room and a new power house will be built by the Ohio Steel Foundry Company, Lima, Ohio. The proposed additions will cost about $15,000.

The M. Work Soap Company, Cincinnati, is expected to commence work soon on a large soap factory at St. Bernard, a Cincinnati suburb.

## Cleveland

CLEVELAND, OHIO, March 19, 1912.

Business with the local machine tool dealers the past week was only fairly active, being confined mostly to scattered orders for single tools. The demand for large tools is light. Orders for the most part are coming from small concerns. Railroads in this territory are making no purchases of machinery. Local machine tool builders generally report an improvement in conditions. Some large foreign orders for automatic screw machines have been received during the past two weeks. A local builder of bolt machinery is running his plant overtime. A number of orders for special machines have recently been placed with a maker of punches and shears. One lathe manufacturer who took a good volume of business during February states that orders have not been so numerous this month. In handling machinery there is a good demand for small cranes and trolleys and locomotive cranes. No new large ore-handling plants are being figured on.

The Ferro Machine & Foundry Company, Cleveland, Ohio, will shortly begin the erection of an addition to its foundry to provide 25,000 sq. ft. additional floor space. Not much new equipment will be required. This company will also probably build an addition to its machine shop during the coming summer.

The Loew Mfg. Company, Cleveland, Ohio, has increased its capital stock from $75,000 to $400,000. The increase is provided to care for the growth of the company's business. No plant extensions are contemplated. The company makes pipe threading machines, feed-water heaters, steam specialties and other machinery.

The Automatic Sprinkler Company, Akron, Ohio, will build a new plant. It will be 235 x 400 ft., one story and of brick and steel construction. Plans are being prepared by Walker & Weaks, architects, Cleveland.

The Cleveland Automatic Clock Company, Cleveland, Ohio, has been incorporated with a capital stock of $250,000, to manufacture automatic clocks and automatic lighting devices. H. P. Shupe, C. A. Bond and others are the incorporators.

The Wise-Harrold Electric Company, New Philadelphia, Ohio, which was recently incorporated with a capital stock of $30,000, will establish a plant for the manufacture of vacuum cleaners. The company is in the market for a small amount of machine tool equipment.

It was reported from Fremont, Ohio, that the Herbrand Company of that city will build a large addition to its plant for use as a moulding room.

The Akron Motor Washer Company, Akron, Ohio, has been incorporated with a capital stock of $10,000 by John Bauer and others.

It is announced that the Zelmer Brothers Packing Company, Toledo, Ohio, which has increased its capital stock from $450,000 to $1,000,000, will double the capacity of its plant.

It is announced by the Owens Bottle Machine Company, Toledo, Ohio, that it will build a large plant to replace the one recently burned.

Bids will be received by the city clerk of Andover, Ohio, March 25, for the construction of a sewage disposal plant in that city.

It is reported from Toledo, Ohio, that the Auglaize Power Company has had plans prepared and will during the coming spring start work on a $500,000 hydroelectric plant with 5000 hp. capacity, to be located on the Auglaize river near Delphos, Ohio. James S. Ashley of Toledo is president of the company.

The building of a new sewage disposal plant is being considered by the village of Geneva, Ohio. Engineer B. F. Hewitt has made a report to the council recommending the expenditure of $17,000 for that purpose.

## Detroit

DETROIT, MICH., March 19, 1912.

Local machine tool dealers report an improved volume of business the past week, but there seems to be some division of opinion as to whether this activity is only a spurt or that a continued betterment in conditions will be maintained. Some little business in small tools and shop equipment for the automobile trade has developed and further inquiry from this source is pending. The demand for second-hand machinery is fairly good. Transactions in boilers, engines and heating apparatus have been more numerous, although the installations have been generally of the smaller class. Power transmission equipment is not in much demand. Building operations are increasing in volume and a large amount of work is being figured on at the present time.

The Suburban Motor Car Company, recently incorporated with $500,000 capital stock, has acquired a tract of about 250 acres in Ecorse, a Detroit suburb, on which it will locate its automobile plant and establish homes for its employees. The plans for the proposed plant call for a main building 300 x 800 ft., a central power and heating plant and two groups of buildings to be used for the manufacture of parts and accessories. While the buildings will not be completed until late in the summer, the local trade is interested in the new enterprise, as it will call for a very large amount of equipment. William A. DeSchaum of Detroit is vice-president and general manager.

The Detroit Air Products Company has been incorporated, with $300,000 capital stock, to manufacture various gases, such as oxygen, etc., and appliances for utilizing the same. The company's officers are Frank C. Benamin, Arthur H. Nichols and Ira H. Benjamin.

The Card Lumber & Mfg. Company has been incorporated, with $100,000 capital stock, by Charles W. Kuehl, James I. Butcher and James W. Lewis. The new company will manufacture boxes and wooden novelties and do a general woodworking business.

The Triumph Mfg. Company has been incorporated, with a capital stock of $75,000, to manufacture machinery, tools, motors and motor parts. Denton Guinness is the principal stockholder.

The Kelsey Wheel Company, manufacturer of automobile wheels, has taken out a permit for the erection of two one-story brick factory buildings and a brick dry kiln, to be erected at Hammond and Michigan avenues. The cost of the new buildings will total $40,000.

The Lewis Construction Company has been organized, with $5,000 capital stock, to do a general contracting business. George W. Lewis is the principal stockholder.

The Winkley Mfg. Company, manufacturer of oiling devices, has begun the construction of a one-story addition to its factory at 866 West Warren avenue.

The City Concrete & Coal Company is erecting a building to be used for shop purposes at Visger street and Grand boulevard.

The Monarch Laundry Company will build at 577-579 Woodward avenue a two-story factory building at an estimated cost of $10,000.

The city of Wyandotte, Mich., is in the market for a new fire engine and hose cart. John L. Sullivan, City Clerk, may be addressed.

The Detroit Novelty Mfg. Company has been incorporated, with $5,000 capital stock, to manufacture sash and doors. The incorporators are L. P. and G. L. Dierick and Clarence Burger.

The Howard G. Harris Company has been organized, with a capital stock of $4,000, to do a metal polishing business. Howard G. Harris and John Heenan are the principal stockholders.

The Evart Light & Power Company, Evart, Mich., has been granted a franchise for the operation of a public service plant and will soon commence the construction of a power plant of reinforced concrete 60 x 64 ft. The initial installment of machinery will be in two units, each of 400 kw. capacity.

The Malloch Knitting Company, Grand Rapids, Mich., has been incorporated, with $25,000 capital stock, by Aurelia Malloch, Charles W. Malloch and others. A knitting mill will be equipped.

The American Laundry Company, Grand Rapids, Mich., will erect and equip a large addition to its present plant on South Division street.

The Lansing Iceless Packer Company, Lansing, Mich., has been organized with $30,000 capital stock, and will equip a factory for the manufacture of a patented iron container. Charles W. Kalder is the prin-

cipal stockholder. The company is being financed by the Lansing Chamber of Commerce.

The city of Owosso, Mich., will donate 40 acres of land to the Ann Arbor Railway for a site for new car shops. President Ramsey of the railroad has approved the matter and it is expected that work will soon be under way.

The New York State Steel Company is having plans drawn for a power house at the company's mines at Iron River, Mich. Rudolph Ericson is the engineer in charge.

The Board of Commerce, Bay City, Mich., is negotiating for the removal to that city of the Duplex Coil Company, now located at Fond du Lac, Wis. A large part of the money necessary to finance the removal has been secured.

The National Storage Company, Kalamazoo, Mich., has been incorporated, with $50,000 capital stock, and will at once begin the erection of two large storage buildings, for which elevators, etc., will be required. Edgar Raseman is secretary and treasurer.

The Michigan Chemical Company has been incorporated at Holland, Mich., with $15,000 capital stock, and will begin the erection of a factory for the manufacture of chemicals at once. The directors are Hugh Bradshaw, Nicholas Hofsteen and Edward Michmessechnizen.

H. C. Haller, Bay City, Mich., will erect a factory at Lansing for the manufacture of cement products. A company with a capital stock of $10,000, to be known as the Lansing Cast Stone Company, is being organized to carry on the business.

D. A. Stratton, Grand Rapids, Mich., will establish a factory for the manufacture of implement handles at Atlantic, Mich.

The Albion Gas Company, Albion, Mich., will erect a new gas holder with a capacity of 100,000 cu. ft. and will install a considerable quantity of new machinery in its plant.

The Michigan Paper Company, Plainwell, Mich., is having plans prepared for a new building 47 x 96 ft. and three stories, which it is stated will be used as a cooker and washer room.

The taxpayers of Manchester, Mich., voted March 11 to bond for $27,000 for waterworks.

It is reported that the Michigan Wheel Company, Grand Rapids, Mich., will build a large addition to its plant this spring.

The National Coil Company, Lansing, Mich., has filed amended articles of incorporation, increasing its capital stock from $40,000 to $100,000.

The Cheboygan Electric Light & Power Company, Cheboygan, proposes to expend $40,000 on improvements and betterments this year, contingent upon a renewal of its franchise. The proposition will be voted on April 1.

The Duluth, South Shore & Atlantic Railroad has announced that it will build a new roundhouse at Sault Ste. Marie, Mich.

The Michigan Metal Products Company has been incorporated at Battle Creek, Mich., with a capital stock of $10,000, and will engage in the manufacture of sheet metal specialties.

The Soo Machine & Engine Works Company, Sault Ste. Marie, Mich., is planning the erection of a one-story factory 94 x 164 ft.

The Board of Water Works Commissioners, Lansing, Mich., has decided to purchase a new unit for the municipal water plant, including a turbine, generator and condenser. J. Edward Roe is president of the board.

The Postum Cereal Company, Battle Creek, Mich., manufacturer of breakfast food, has completed plans for the erection of an additional factory building 67 x 112 ft. of heavy mill construction.

P. F. Rolfe has acquired the machine and pattern shop formerly operated by H. A. Davis at St. Joseph, Mich., and will improve and increase its equipment.

The Belcarmo Nut Butter Company, Grand Rapids, Mich., now occupying leased quarters, is planning the establishment of a plant of its own. The company has a capital stock of $50,000.

The binder plant at the Michigan State Prison, Jackson, Mich., is to be enlarged by the installation of 20 additional spinning machines. The new equipment has not yet been contracted for.

The Chamber of Commerce, Jackson, Mich., has completed arrangements whereby the plant of the Hastings Motor Shaft Company will be removed from Hastings to Jackson. The Chamber of Commerce will build a new factory for the company and its facilities will be enlarged.

It is currently reported that the American Gear Company, Jackson, Mich., will double the capacity of its plant this spring. The company manufactures automobile gears.

The plant of the Hirt Cut Stone Company, Grand Rapids, Mich., was destroyed by fire March 3, causing a loss of $10,000. The company will rebuild, and included in the machinery which will have to be replaced are several dynamos, stone cutters and planers.

## The South

LOUISVILLE, KY., March 19, 1912.

Business has been rather irregular during the past week, continued unseasonable weather having a natural effect in cutting down the volume of orders. However, there is a generally optimistic feeling, most of those in the machinery business believing that the weather has held back a lot of business which is sure to come out as soon as conditions are more favorable. There is plenty of substance to the market in the form of inquiries, new manufacturing projects, etc., so that the prospect for a good spring trade is excellent. There is a better call for machine tools in this immediate territory, and power apparatus continues in good demand.

F. W. Ferguson, Louisville, is planning the formation of a company to manufacture a patented ventilator and chimney cap, which will likely be constructed of metal. He has been making inquiries as to the machinery which will be required to manufacture the products. The formation of the company will probably be arranged in about ten days.

Fire destroyed the plant of the Capitol Laundry, Russell Broadus, manager, 622 East Jefferson street, Louisville. It will be replaced at once, and a boiler and other power apparatus will be needed, as well as special laundry equipment. The cost of the new plant will be about $10,000.

The Peter Fox Sons Company, Hopkinsville, Ky., is planning the construction of an ice factory. Refrigerating apparatus may also be installed in its canning plant.

The Southern Kentucky Machinery Company, Bowling Green, Ky., which was recently organized, has leased the Gerard Building and is installing a stock of mill, mining and electrical machinery. J. W. Bearce is manager of the company.

The Cumberland Natural Gas Company, Barbourville, Ky., has acquired the water-works plant and is negotiating to take over the plant of the Barbourville Electric Company. In the event of the deal going through a number of improvements will be made in all the properties.

Falmouth, Ky., has received 23 bids for the construction of its municipal electric light plant, but the figures are higher than expected. It is likely that an additional bond issue will be required to provide funds for the plant.

Corydon, Ky., is considering the issue of bonds for the construction of an electric light system.

J. A. Rose, electrician of the Greenville Light & Water Company, is considering the construction of a power house at a point between Greenville and Central City, Ky., and the distribution of current to coal mines in that section, the machinery of which is operated by electricity.

The Consolidated Coal Company, Baltimore, Md., is constructing an electric light and power plant at Jenkins, Ky., for the lighting of that and other nearby industrial towns and the operation of the water-works system at Jenkins.

The Reynolds White Sand Company and the Reynolds Silex Company, Bristol, Tenn., have been consolidated by R. S. Reynolds, formerly of the R. J. Reynolds Tobacco Company, and a plant will be established to manufacture glass specialties.

The Walsh & Weidner Boiler Company, Chattanooga, Tenn., has increased its capital stock from $150,000 to $200,000 and is preparing to enlarge its plant. This has been made necessary largely because of the increase in the export business of the company. The addition will especially provide for the extension of the steel tank department. The extension will be 90 x 150 ft., of steel construction and will be erected as soon as possible.

The capacity of the plant of the Volunteer State Phosphate Company, Centreville, Tenn., is to be doubled, the company planning to spend $25,000 in improvements. A large pumping station will be constructed, enabling the hydraulic mining plant to operate at greatly increased capacity. S. M. Ward is general manager of the company.

The Great Falls Power Company, which is erecting

a large hydroelectric plant at Rock Island, Tenn., on Caney Fork, is rapidly preparing to begin the construction of its plant. It is said that the company is also planning the operation of a number of interurban electric lines with power from that plant. The capital stock of the company is $625,000. An 80-ft. concrete dam will be constructed.

C. F. McGhee, Pinkney, Tenn., is erecting a large saw and planing mill and will manufacture flooring, lumber and interior finish.

The Priestley-Loyd Light & Power Company, Henderson, Tenn., which was recently organized, is equipping a plant for the manufacture of electric light.

The Little Giant Stump Puller Company, Hattiesburg, Miss., has been incorporated to manufacture a patented stump puller. The company has leased quarters but contemplates the erection of a plant in the near future.

The Jackson Woolen Mills, Jackson, Tenn., is preparing to establish a factory in New York.

The Nashville Bridge Company, Nashville, Tenn., is in the market for a gasoline pump, as well as a rock crusher with a daily capacity of 75 cu. yd.

R. E. Smith, Ruskin, Tenn., is asking for prices on an 80-hp. boiler.

James L. Hale, Memphis, Tenn., is planning the erection of a large sawmill near Monroe, La., for the manufacture of cypress lumber, following the purchase of a large tract of timber. The mill will be operated under the name of the Boueff River Land & Lumber Company.

Whigham, Ga., will erect an electric light plant. A. Harrell is mayor.

Whitaker, N. C., is to erect an electric light plant in the near future. Address J. O. Hearne.

Fayette, Ala., is having plans drawn for a water plant by Edgar B. Kay, Tuscaloosa, Ala. A power house will be erected, and a triplex pump, operated by a natural gas engine, will be installed.

Americus, Ga., is to issue bonds for the purpose of constructing an electric light plant. J. E. Mathes is mayor.

Argenta, Ark., is to install a 500-hp. engine, direct connected to a 300-kw., three-phase alternator, as well as boilers and other equipment. J. P. Faucette is mayor.

The Northumberland-Potomac Packing Corporation, Sunnybank, Va., is in the market for a 40-hp. boiler, a 6-hp. steam engine and a 4½-hp. gasoline pump. Special packing equipment is required.

D. A. Burwell, Stovall, N. C., is planning the erection of a plow factory and will probably require foundry equipment.

The Campobello Oil Mill, Campobello, S. C., is in the market for a Corliss engine, new or second-hand, and two return tubular boilers.

The Virginian Railway Company, Norfolk, Va., is reported to be planning the erection of additions to its round-house and erecting shop at Princeton, W. Va., and will require a 20-ton and a 30-ton traveling crane and other equipment. H. Fernstrom is chief engineer.

The International Harrow Cultivator Company, North Birmingham, Ala., is to install metal-working machinery.

The Gulf Iron Works, Tampa, Fla., will erect an addition to its machine shop at an estimated cost of $2,000. The contract for the building has been let.

The Norcross Plow Company is reported to be planning the erection of a plant at Athens, Ga.

The Morrison Company, Atlanta, Ga., will erect a plant for the manufacture of machine tools and electrical machinery. Montford Morrison is at the head of the concern.

The Barnes Sheet Metal Company, Atlanta, Ga., is to equip a shop for handling sheet metal work of all kinds. J. M. Stevens is president.

The Cape Fear Machine Works, Wilmington, N. C., will erect a machine shop, foundry, blacksmith shop and power house. B. H. Stephens, Wilmington, is in charge of the construction.

The Jackson Ornamental Iron & Bronze Works, Jackson, Tenn., is embarking in business this spring, making especially brass grill work and steel fixtures for banks and offices. J. C. Felsenthal is president; W. R. Sparkman is vice-president, and J. J. Losier, former postmaster, is secretary and general manager.

The Chattanooga Iron & Wire Works, Chattanooga, Tenn., which is reorganizing its plant, is in the market for automatic wire-working machinery, tinning and plating apparatus, electric welding machines, etc. J. E. Morelock is superintendent.

The Universal Stenotype Company, Owensboro, Ky., is contemplating increasing its equipment to about double the capacity of its plant.

## St. Louis

ST. LOUIS, MO., March 18, 1912.

The developments in the machine tool trade have been, the past week, of a rather negative sort. There has, in fact, been a slight cessation in the inquiry, though the aggregate of business done remains about the same as reported for previous weeks. The inquiry is still for single tool, with some request for second-hand machinery. Collections are good and the feeling is optimistic.

Difficulties in the way of the immediate construction of the big engine manufacturing plant of the Busch-Sulzer Bros.-Diesel Company have developed by the refusal of the Mayor of St. Louis to sign a bill vacating alleys to make the site of the plant one complete area of land. There will be a possible change of location.

The California Tanning Company, with $100,000 capital stock, has been incorporated at California, Mo., by William Heck, Fred Hert, E. C. Beckman, of St. Louis, and A. L. Howard, Frederick Hempel, J. W. Major, C. H. Rowland, H. B. Hardy and others, to establish a tannery at California with modern mechanical equipment.

The St. Louis Municipal Assembly has asked the City Water Commissioner to provide plans for suitable intakes and mechanical equipment to prevent floating ice in the river from interfering with the city water supply.

John A. Damm & Sons, St. Louis, have completed arrangements for the construction of a three-story factory which will be equipped for the manufacture of brushes of all types.

The Granby Mining & Smelting Company, St. Louis, E. S. Gatch, president, has completed its plans and has begun the preliminary work of erection of a new smelter and metal manufacturing plant at East St. Louis. The plant, with its equipment, will cost at least $2,000,000.

The Doe Run Lead Company, which is owned by the same interests as control the St. Joseph Lead Company and the Mississippi River and Bonne Terre Railway, has been refinanced in St. Louis by the issue of $2,000,000 of bonds, with the result that the plants of the company will be rehabilitated to a considerable extent by the introduction of new equipment.

The Brokaw-Eden Mfg. Company, St. Louis, has been incorporated by H. G. Seaber, P. V. D. Brokaw, E. N. Brokaw and H. W. Eden, and will equip a plant for the manufacture of special machinery.

The Acme Coal & Mining Company, Kansas City, Mo., with $20,000 capital stock, has been formed to equip and operate mining property owned by the stockholders, Jos. P. Fontron, W. H. Condit and J. H. Smith.

The Nashold Centrifugal Machinery Company, Davis Junction, Ill., has been incorporated with $100,000 capital stock by M. N. Nashold, Earl Gould and Leonard Knott, and will equip a plant for the manufacture of special machinery.

The Contractors' Tool Supply Company, Sycamore, Ill., has been incorporated by F. B. Townsend, George A. Peter and L. C. Shaffer to manufacture tools.

Belleville, Ill., has granted a franchise to the Belleville & Mascoutah Traction Company to operate gasoline propelled interurban cars into the city. The track and power plant will be installed with the opening of spring.

The Dorris Motor Car Company, St. Louis, has completed plans for the immediate erection of a new power plant adjoining its automobile factory.

The William J. Lemp Brewing Company has begun the construction of a $35,000 building which will be equipped with new mechanical bottling apparatus.

The Anheuser-Busch Brewing Association has begun the construction of a coagulating plant for the purifying of its water and will equip it with mechanically operated coagulation machinery.

The Railway Devices Company, St. Louis, Mo., has been incorporated to manufacture appliances for the construction and repair of locomotives. The authorized capital stock is $5,000 and the incorporators are Louis A. Hoerr, John Kilburz and C. E. Chaffee.

The Drake-Williams-Mount Company, Omaha, Neb., has secured land upon which to build a 60-ft. addition to its present boiler shop. The work will start as early as possible this spring.

The W. J. Green Company, Hugo, Okla., has been incorporated with $25,000 capital stock. A plant to manufacture metal specialties will be erected, and the company is in the market for its equipment.

The authorities of Little River and of Claflin, Kan.,

have each taken up plans for the installation of waterworks plants.

Hillsboro, Kan., is preparing to vote upon a bond issue for the construction of a transmission line and an electric lighting and power plant.

Eimarron and Syracuse, Kan., are both considering the establishment of waterworks and of electric light and power plants, both municipally operated.

The Carthage Marble & Building Stone Company, Carthage, Mo., has been incorporated with $50,000 capital stock to open and equip a quarry with machinery. The incorporators are J. W. Aylor, B. L. Van Haase and C. C. Carter.

Eastern capitalists, represented by Thomas Williamson, Edwardsville, Ill., have closed the purchase of 2500 acres of coal lands and will install mining equipment and develop the property at once.

The Kasbeer Farmers' Elevator Company, Kasbeer, Ill., with $60,000 capital stock, has been organized by George Stanard, Peter Paulson and Sanford Stiles to equip a grain elevator.

## Indianapolis

INDIANAPOLIS, IND., March 19, 1912.

The Pedalmobile Mfg. Company, Indianapolis, has increased its capital stock from $2,500 to $25,000.

The Ideal Seed & Grain Separator Company, Indianapolis, has been incorporated with $250,000 capital stock, to manufacture agricultural machinery. The directors are C. B. Marshall, J. C. Benson and W. B. Denison.

The Noelke-Richards Iron Works, Indianapolis, has increased its capital stock from $100,000 to $250,000.

The Novelty Mfg. Company, Indianapolis, has been incorporated with $5,000 capital stock, to manufacture fishing and other sporting goods. The directors are J. F. Bickel, M. Bath and A. E. Cotter.

The capital stock of the Frank S. Betz Company, Chicago, manufacturer of surgical instruments, with a plant at Hammond, Ind., has been increased from $750,000 to $1,000,000, the increase to be used in building warehouses and shops and in establishing a distributing branch in London, England.

The Indiana Silo Company has bought a 10-acre tract at Anderson, Ind., on which to erect a factory for the manufacture of silos. The main building will be 60 x 1000 ft., divided every 100 ft. by a fire wall.

The Kenney Machinery Company, Indianapolis, has increased its capital stock by an issue of $30,000 of preferred stock.

The Gilson Motor Starting Company, Indianapolis, has been incorporated, with $5,000 capital stock, to manufacture motor starters, speeders, primers, etc. The directors are R. K. Allison, Bert Gilson and R. B. Allison.

The Salem Box Company, Vincennes, Ind., has been incorporated, with $75,000 capital stock, to manufacture boxes and crates. The directors are J. S. Stonecipher, T. S. Marshal and E. J. Binford.

The Schuler Implement Company, Evansville, Ind., has been incorporated, with $30,000 capital stock, to deal in hardware and agricultural implements. The directors are C. Koehler, W. J. Schuler and F. C. Schuler.

The Eli D. Miller Folding Bed Company, Evansville, Ind., will double its factory capacity by the building of a three-story addition, to cost $50,000.

The Given-Moore Company, Columbus, Ind., recently mentioned as having been incorporated, has acquired a factory and is now in the market for its equipment, which includes a planer, band saw, circular and rip saw, swinging cut-off saw, jointer, planer, boring machine; a hollow chisel mortising machine for its wood shop, 12-in. lathe, 4 or 6-ft. radial drill, keyseater, punch and a 20- or 25-hp. A. C. motor.

The King Measuring Device Company, Anderson, Ind., has been incorporated with $40,000 capital stock to manufacture measuring machines. The directors are D. S. Quickel, F. H. Smith and L. A. Stephens.

The Modern Specialties Company, Goshen, Ind., has increased its capital stock from $25,000 to $50,000.

The Central Heating Company, Anderson, Ind., has been incorporated with $130,000 capital stock to supply heat, light, and power, under a franchise granted to Otis P. Crim. The directors are O. P. Crim, J. L. Vermillion, J. W. Lovett, M. G. Reynolds and Allen Richwine.

The Delphos Bending Company, Bluffton, Ind., has been incorporated with $25,000 capital stock to manufacture wood and metal bent goods. The directors are H. S. McLeod, M. J. Justus and H J. North.

The T. W. Warner Mfg. Company, which has plants at Toledo, Ohio, and Muncie, Ind., will enlarge the latter, trebling its capacity. The company manufactures automobile parts.

Burns & McDonnell, Kansas City, Mo., have been authorized by the City Council of South Bend, Ind., to prepare plans for a waterworks system at an estimated cost of $200,000.

## Texas

AUSTIN, TEXAS, March 16, 1912.

Oil field development keeps up a constant and good demand for drilling machinery and equipment used in that class of operations. There is also considerable use made of smaller tools in these fields, and dealers report a good trade in this line. In the matter of new manufacturing plants prospects are favorable for this year, being an unusually good one in that respect as to Texas, New Mexico and Arizona. In Mexico political conditions continue very much disturbed, and there are practically no orders now being placed for American machinery from that country.

J. T. Cameron will install a pumping plant and irrigation system upon a tract of land near Plainview.

L. F. Daniel, engineer, has finished the survey of the proposed drainage district in the northern part of Orange County to embrace about 30,000 acres of land. It is estimated that the cost of the proposed works will be about $30,264. The commissioners' court will call an election of taxpayers of the proposed district to vote on the proposition of issuing bonds for the work.

The Liverpool Oil Company, Houston, has been formed with a capital stock of $7,000. The incorporators are Charles M. Fisher, John T. Boyle, Albert La Huis and Wolsey Weyant.

The Hart-Parr Company, Charles City, Iowa, which has a capital stock of $20,000, was recently granted a permit by the secretary of state of Texas to do an engine manufacturing business in this State. Its headquarters are at Houston.

The Lott Electric Company is rebuilding its electric light and power plant at Lott. The new plant will be considerably larger than the old.

The chamber of commerce of Temple is negotiating for the locating there of a soap products factory and a cotton cloth mill.

The Texarkana Tie Company, Texarkana, has been formed with a capital stock of $10,000 for the purpose of manufacturing railroad cross-ties. The incorporators are A. S. Watlington, C. H. Moss, E. L. Beck and J. R. Watlington.

J. B. Smith of Beaumont, and associates, will install machinery for operating the extensive asphalt deposit situated near Cline. They also contemplate erecting a large asphalt plant at Beaumont.

A. K. Bass of De Leon is installing an electric light and power plant at Eastland.

The Jenner Mfg. Company, which was recently organized at San Antonio with a capital stock of $50,000, will install a plant for manufacturing and bottling carbonated waters and various kinds of soft drinks. The incorporators are J. W. Judson, Edward J. Jenner, Walton D. Hood, H. L. Leick and J. R. Hood.

The National Development Company is erecting a plant at Texline for the manufacture of porous tile for sub-irrigation. J. P. Hardin of Oklahoma City is largely interested in the project.

The Bering Mfg. Company, Houston, has increased its capital stock from $80,000 to $300,000 for the purpose of enlarging its business.

The S. H. Supply Company, Beaumont, recently increased its capital stock to $20,000 from $4,000. It will enlarge its business.

J. W. Embrey will install a plant at Brady for the manufacture of brooms.

The Standard Compress Company is preparing to rebuild its cotton compress at Houston that was destroyed by fire. The new plant will be much larger than the old one, and will be equipped with most modern machinery.

It is announced by George H. Clifford, vice-president and manager of the Northern Texas Traction Company at Fort Worth, that the recent increase of its capital stock from $4,500,000 to $6,000,000 is to provide for extensive improvements. Among these will be the enlargement of the power station at Handley to consist of the installation of an additional 5000-kw turbine. The company's shops will also be enlarged and improved.

An additional pump will be installed at the plant of the municipal system at Uvalde. New mains will also be laid.

The Houston Oil Company, controlling the properties of the former Kirby Lumber Company, including

about 800,000 acres of timber and oil lands, has completed plans to develop the oil resources and will be in the market shortly for necessary machinery, etc. S. W. Fordyce of St. Louis, Mo., is president of the company, which has a capital stock of $20,000,000.

The East Texas Traction Company, Greenville, was recently granted a charter to construct an interurban electric railway between Dallas and Wolfe City. The first division to be constructed will be between Dallas and Greenville, 70 miles, and will cost, it is estimated, to build and equip, approximately $1,850,000. The power plant that is to be installed will be large and modern in every respect.

The Texas City Transportation Company has had plans prepared for a new pier and a large steel and concrete warehouse at Texas City. It will also install additional equipment for handling freight at that port.

The Mimbres Valley Growers & Canning Association has been formed at Deming, N. M., for the purpose of installing a large fruit and vegetable canning factory. R. W. Yeargin is president; J. P. Dunnaway, secretary and treasurer, and H. B. Strickler, vice-president.

M. J. Flowers will install a cotton gin at Wealder at a cost of about $4,000.

The Colorado River Power Company, which is constructing a dam across the Colorado River and constructing a hydroelectric plant at Marble Falls, is arranging to construct a system of power transmission of about 100 miles. C. H. Alexander of Dallas is presilines in a number of towns in this part of the state. One of these lines is to run to San Antonio, a distance dent.

Dew Bros. will erect a large canning, pickling and syrup factory at Dewalt.

## The Pacific Coast

PORTLAND, ORE., March 12, 1912.

Conditions in the machine tool market are not altogether satisfactory. While a good many inquiries have come out since the first of the year, there has been less figuring than was anticipated, and only a few transactions of any consequence have been closed. There is, as usual, a fair volume of small single-tool business, but nearly all the larger inquiries seem to be entirely of a tentative nature, and conditions are not encouraging for much improvement in the near future. Agents who have recently visited eastern Oregon and Washington report business very dull throughout that district. Other classes of machinery continue in fair demand, though the increase over last year is hardly up to expectations in some quarters. The lumber interests are constantly in the market, and a few good-sized orders have been placed for mill and logging outfits. Deliveries of cannery equipment for Alaska are being rushed, and considerable mining machinery will be shipped to Alaska during the spring and summer. Many inquiries are coming up for public service projects, mainly water and lighting systems, and considerable business is expected from electric traction interests.

It is reported that the Southern Pacific Railroad will soon start work on a large car shop at Oswego, Ore.

The Nisqually Iron Works, Tacoma, Wash., has been incorporated with a capital stock of $40,000 by James R. Thompson, A. G. Browne and others.

Plans are about completed at the local office of the Pacific Power & Light Company for a substation at The Dalles, Ore., which will be equipped with three large transformers and considerable other machinery.

The C. A. Smith Lumber Company, Marshfield, Ore., is completing plans for a large electric generating plant for the operation of logging machinery.

The Macleay Estate Company, this city, expects to install a sawmill shortly on its timber land in Curry county, Ore.

The Brighton Mills Company is working on a new sawmill project near Nehalem, Ore.

Hegardt Bros. & Elliott are figuring on machinery for a brick plant at Terrebonne, Ore.

Specifications have been forwarded to Washington for two new 24-in. suction dredges for Government use on Columbia River. A call for bids is expected shortly.

The Seattle Brewing & Malting Company, Georgetown, Wash., is preparing to install two boilers of 1000 hp. each, in addition to improvements in the engine room and ice plant.

Considerable business is coming at present from the logging camps around Vancouver, Wash., several of which resumed operations about the first of the month.

The St. Helens Creosoting Company, St. Helens, Ore., recently organized, has completed arrangements for the construction of a large plant for creosoting piles and timbers.

The Portland Gas & Coke Company, Portland, Ore., is preparing plans for a large gas plant in North Portland.

The Stimson Mill Company, Ballard, Wash., has decided to dismantle its old mill and erect a new one, installing new machinery throughout. According to present plans the new mill will be operated by electricity.

It is reported that the South Tacoma repair shops of the Northern Pacific Railroad will be removed to Auburn, Wash.

The municipal authorities of Seattle, Wash., are considering the installation of a steam power plant for electric lighting purposes.

The Lamb Machine Works has been incorporated at Hoquiam, Wash., with a capital stock of $50,000 by F. H. Lamb and W. J. Carlson.

The Universal Range Company is having plans prepared in the office of J. S. Atkins, architect, Portland Ore., providing for a two-story mill construction factory building 50 x 100 ft. An expenditure of $25,000 is contemplated.

Smith, Emery & Co., Los Angeles and San Francisco, Cal., assayers and metallurgists, are completing one of the best-equipped ore testing plants in the country at Los Angeles, the equipment including a powerful stamp mill, elevators, amalgamation plates, concentrators, classifiers, pumps, filter, tube mill, crushers, etc.

P. Stakle, an engineer in the employ of the Russian Government, arrived in San Francisco this week, and is in the market for reclamation machinery for use in the swamp land of the Amur River.

The Baker Friction Transmission Company, San Francisco, has been incorporated with a capital stock of $100,000 by A. J. Bierne, C. T. Quirey, T. C. Bates, E. N. and C. E. Baker.

The town of Vallejo, Cal., will shortly install a new pumping plant with electric power.

The Taylor Foundry, Grass Valley, Cal., is working on a pumping outfit for the Champion mine near that place.

## Eastern Canada

TORONTO, ONT., March 15, 1912.

Though the winter is prolonged there is little complaint about the demand for machinery and equipment. There is still delay in the movement of merchandise, because of the snowstorms, and there is a very sparing supply of coal. Anxiety on the latter point begins to be expressed, as the failure of the miners to come to an agreement with the mine owners both in the anthracite and the soft coal districts gives seriousness to the outlook for the summer coal supply. The budget speech, which was delivered by the Canadian Finance Minister on March 13, left things as they were. There were no announcements of alterations in the duty and no renewal of the steel bounties. Hence there was no disturbance of trade.

The sum of $250,000 is being expended on extensions of the Hamilton Bridge Works Company's plant, Hamilton, Ont.

The Duncan Lithographing Company, Toronto, is planning to erect a new building and put in the machinery for a large paper box plant.

Voting on a by-law granting concessions to the St. Marys Machine Company, St. Marys, Ohio, to establish a Canadian factory in Chatham, Ont., will take plce on April 8. The company will occupy a part of the plant of the Defiance Iron Works, Chatham. The company will employ 50 men during the first year and have a payroll of $30,000. The company will be incorporated with a capital stock of $100,000, of which $70,000 will be fully paid up. The city is interested in the Defiance works to the extent of $20,000.

Construction will be begun in May upon the New Brunswick Hydro-Electric Power Company's plant at St. John, N. B., which is estimated to cost $2,000,000.

The ratepayers of Owen Sound, Ont., have approved the by-law for the construction of a dry dock and shipbuilding plant in the town to cost $1,500,000. The town will bonus the undertaking $10,000 per annum for 20 years and will take $50,000 of stock in the company.

The ratepayers of Owen Sound, Ont., have approved the by-law to give the Canadian branch of the Aetna Rubber Company, Cleveland, a five-acre site and a fixed assessment of $20,000.

The Appleton Wire Cloth Company, Milwaukee, Wis., will, it is said, build a factory at Ottawa, Ont.

The Canada Steel Goods Company, Hamilton, Ont., is having plans prepared for an addition to its plant, 80 x 100 ft., at a cost of $10,000.

Plans are being prepared for a $10,000 addition to the Canada Shovel Company's plant, Hamilton. It will erect a steel structural building 60 x 100 ft. and two stories.

The Ontario Electrical Devedopment Company, whose power development works are at Niagara Falls, Ont., is about to begin the construction of the south wing of its plant.

The Gartshore-Thomson Company, Hamilton, Ont., will erect a new foundry to employ 100 hands. It has a $250,000 contract for cast iron pipe for the city waterworks.

The Ottawa Light, Heat & Power Company, Ottawa, Ont., has decided to instal an auxiliary steam turbine plant of 4000-hp. capacity.

The Holman Electric Sign Mfg. Company, Toronto, has purchased the factory formerly occupied by the Electro-Steel Company at Welland Canal and Michigan Central Railroad, Welland, Ont., and after making extensive alterations and installing equipment will move its plant from Toronton.

The Napanee Iron Works, Ltd., Napanee, Ont., has been incorporated by J. P. Vrooman, J. M. and T. B. Wallace and Edmund J. Roy, provisional directors. The company has a capital stock of $200,000. The erection of a plant is contemplated.

The Fire Protection Equipment Company, Ltd., Toronto, recently incorporated with $50,000 capital stock, by Geo. D. Perry, Sidney B. McMichael and Stanley V. L. Wilmot, will engage in the manufacture of fireproof doors and windows and metal lath.

## Western Canada

WINNIPEG, MAN., March 14, 1912.

Trade conditions are apparently very satisfactory. The chief drawback for some time has been the delay in marketing the crop, resulting in poor collections. The money market generally seems to be quite favorable to this part of Canada, however, and business in the investment line is active. Industrial concerns are meeting with much encouragement, and prospects of a healthy expansion continue very bright.

A. C. Von Hagen, president of the United Flour Mills Company, Minneapolis, is on a trip through western Canada. It is announced that his company has decided to either build one or two flour mills in this part of Canada, or else purchase plants already established.

A. H. Coplan, general manager of the A. H. Coplan Company. Ltd., brass founder and manufacturer of steel castings, Ottawa, Ont., has been on a visit to Winnipeg and other western points looking into the opportunities of locating a branch manufacturing plant either in this city or some place further west.

The citizens of Canora, Sask., have passed a bylaw to spend $10,000 on fire protection.

Matthews, Lang & Co., Ltd., pork packers, Hull, Peterboro and Montreal, have purchased a site in Winnipeg on which it is said they will erect an eight-story warehouse, with cold storage facilities, etc.

The sash and door factory of the Radford-Wright Company, Winnipeg, was burned March 9. The company had orders on hand for a very large amount of work, and the plant is likely to be rebuilt at once.

The Pacific Coast Timber Company, Ltd., Vancouver, B. C., is planning the erection of a new mill at Prince Rupert, or some suitable point on the Queen Charlotte Islands.

James McMartin contemplates erecting a sawmill at Port Hammond, B. C.

The Western Canada Shingle Company, controlled by Chinese in Vancouver, have made arrangement to erect a combination mill across the Fraser River, from New Westminster.

The Edmonds Development Company, Edmonds, B. C., contemplate building a sawmill at that point.

The Canadian Collieries, Ltd., Union Bay, B. C., will shortly erect a circular equipment sawmill of 30,000 ft. capacity there.

Young & Scott are arranging for the erection of a small lumber and shingle mill at Kerrisdale, near Vancouver, B. C.

Bloedel, Stewart & Welch, Ltd., Vancouver, B. C., recently incorporated with a capital stock of $500,000, contemplate the erection of a sawmill next season.

The Renata Lumber Company, Ltd., proposes to establish a small lumber mill at Renata, on Arrow Lake, in the Kootenay country.

The Bulman-Allison Lumber Company, Ltd., Victoria, B. C., is planning extensive improvements to its plant in that city. The Salt Spring Island mill, burned some time ago, will also be rebuilt.

The Canadian Hogg Motor Company, Ltd., Winnipeg, has been incorporated for the purpose of manufacturing a machine for grinding and pulping roots.

The International Nut Lock Company, Ltd., Winnipeg, has been incorporated for the purpose of manufacturing a new invention in nut locks.

The Alaska Bedding Company, Winnipeg, has decided to establish a branch factory in Calgary, Alberta.

The town of Nelson, B. C., is planning to spend $5,000 on electric lighting system and $8,730 on fire apparatus.

The Antler Goldfields & Development Company, Ltd., Barkerville, B. C., plans to install a large hydraulic plant.

The Blairmore Brick Company, Ltd., Blairmore, Alberta, proposes increasing the capacity of its plant from 40,000 per day to 80,000.

The Sawyer-Massey Company, Hamilton, Ont., will build a modern warehouse in Saskatoon, Sask., this summer, the cost to be $150,000.

In a report on the internal elevator question Commissioner George Langley, Regina, Sask., makes the statement that besides 45 elevators built last year by co-operative elevator companies 50 companies had already been organized this year, and there were applications already in for 150 more.

Tenders for 18-in. cast iron water mains will shortly be received by the City Engineer of Fort William, Ont., the value being about $45,000.

The Canadian Pacific Railway Company will commence construction on its Coquitlam, B. C., terminals to cost $600,000.

## Government Purchases

WASHINGTON, D. C., March 18, 1912.

The Paymaster General, Navy Department, Washington, will open bids April 2, under schedule 4403, class 211, for furnishing and installing furnaces at the navy yard, Philadelphia.

Bids will be opened by the Paymaster General of the Navy Department, Washington, April 16, under schedule 4405, class 141, for one gas-producing apparatus for installation at Puget Sound.

The Paymaster General, Navy Department, Washington, will open bids April 2, under schedule 4386, class 1, for one coal-handling apparatus complete for Mare Island, Cal., and under schedule 4387, class 11, for four motors to operate ventilating blowers on the United States cruiser Brooklyn.

The Commissioners of the District of Columbia, Washington, D. C., opened bids March 7 for installing in the district pumping station a water softening plant as follows:

Kennicott Company, Chicago Heights, Ill., $2,000; L. M. Booth Company, New York, $1,980; Northern Water-Softening Company, Madison, Wis., $1,775; Dodge Mfg. Company, Mishawaka, Ind., $1,700; Gem City Boiler Company, Dayton, Ohio, $1,650; Keystone Chemical Mfg. Company, Philadelphia, Pa., $2,391; Pittsburgh Filter Mfg. Company, Pittsburgh, Pa., $3,200; American Water Softening Company, Philadelphia, Pa., $1,550; W. B. Scaife & Sons Company, Pittsburgh, Pa., $2,475.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids March 12 for material and supplies for the navy yards as follows: Schedule 4356, class 111, ten motors for delivery to Brooklyn—Bidder 57, Diehl Mfg. Company, Elizabethport, N. J., $804 and $740; 71, General Electric Company, Schenectady, N. Y., $7,415.

A description of the Holland cupola, which is an arrangement to combine a reverberatory furnace with the cupola so that the molten metal from the cupola can be delivered into the hearth of the reverberatory furnace where borings, turnings and other forms of steel may be melted, is available in pamphlet form printed for general distribution by the Holland-Domschke Foundry Company, Norman street and Monitor avenue, Brooklyn, N. Y. The combination cupola has already been described in these columns and besides being intended to melt steel, such as small scrap articles and productions of the machine shop in connection with pig and scrap iron, it is found to give a higher grade of product than is ordinarily obtainable from a cupola itself.